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OBSERVATIONS ON THE PROLONGED OCCLUSION TEST.

F. W. MARLOW, M.D.

SYRACUSE, N. Y.

Prolonged occlusion has a relation to muscle imbalance similar to that of cycloplegia to ametropia, and is to be used in a complete study of appropriate cases, both as regards distance and near seeing. Illustrative cases show it cannot be replaced by deductions made from other tests. Theoretic objections urged against it are not well founded.

What cycloplegia is to the study of errors of refraction, the prolonged occlusion test is to that of muscle imbalance. This statement should not be interpreted, as it has been, as an assertion that this test acts exactly in the same way as cycloplegia; but simply that just as cyclopegia is the most efficient means of revealing latent hypermetropia and astigmatism, so the prolonged occlusion test is the most efficient means at our disposal for rendering manifest, or at any rate more manifest, the true state of the muscle balance. In a small monograph, published two years ago, I attempted to point out the differences in the mode of action of these two methods and also their similarity in effect.

The value of cycloplegia is a matter of common knowledge, at any rate among ophthalmologists, and while a certain number prefer to do their refraction work, as a rule, without its use, the existence of accommodative spasm in many cases of hypermetropia and astigmatism and even in many cases of apparent myopic astigmatism, especially in young patients, is universally admitted. Personally I am quite sure that the average results of refraction work in which the information gained by the use of cycloplegia is utilized in determining the formula to be prescribed, are definitely better than when this information is not made available.

Now it often happens that the cycloplegic brings out no latent error. In that case we have gained the information that there was no ciliary spasm, and that knowledge is a decided gain. In many cases it shows the existence of a latent error, which could be detected in no other way, a knowledge of which is essential to a proper understanding, and therefore to an intelligent management of the case.

Now I wish to submit that a knowledge of the muscle balance is just as essential to a thoro understanding of any case of asthenopia as a knowledge of the refraction and accommodation, and that a prolonged occlusion test is just as essential to the study of the muscle balance as cycloplegia in ametropia. I am inclined to go further than that, and to say that it is even more essential.

A comparison of the results of cycloplegia in fifty consecutive cases of refractive error, with the results of the prolonged occlusion test in a similar number of consecutive cases of suspected latent muscle imbalance, shows far greater differences in the before and after tests in the latter than in the former; i. e., precycloplegic tests of the refraction approximate the truth more nearly than do preocclusion tests of the muscle balance.

The average difference brought out by cycloplegia in the one hundred eyes of these fifty patients was 0.53 D. The error amounted to 1. D or more in 27 per cent. The error amounted to 2. D or more in 6 per cent. The highest amounted to 2.75 D. That is, in 67% it was less than 1. D. The average difference brought about by the prolonged occlusion test was 4½° in the exophoria, and slightly over 1½° in the hyperphoria.

The difference amounted to:

5° or more in the Ex. in 17 cases, 34%
7° or more in the Ex. in 12 cases, 24%
2° or more in the Hyp. in 17 cases, 34%
4° or more in the Hyp. in 8 cases, 16%

Altho not strictly comparable, these figures show a tendency to a higher degree of latency in heterophoria than in ametropia.

Judging from the opinions expressed by reviewers and others, there seems to be an impression that cases requiring investigation of this kind are rare. My own experience does not accord with this. As is no doubt the case with other ophthalmologists, I see a very definite percentage of cases in which the most careful correction of the refraction by others or by myself fails to relieve the symptoms complained of, or even aggravates them, either orthophoria or some low degree of heterophoria being present. There are many also in which a partial relief of the symptoms has been accepted as all that was possible in the case, and others in which on account of failure of the correction of manifest errors to relieve, the patient has been referred to the rhinologist, the neurologist or the internist in the search for a non-ocular cause of the symptoms. All told, the cases amount to a considerable number, and as a matter of fact it is unusual for me not to have one or more, sometimes several under observation. When this method has been systematically adopted, many more cases will be found in which its use is desirable than it would seem reasonable to expect. It will be found to have a wider and wider application as time goes on.

Some years ago Geo. M. Gould published a paper giving 68 causes of failure to relieve asthenopia. This particular cause does not appear among them, but my own experience would lead me to think that it is the most important of all, assuming competency on the part of the examiner.

From one source and another I have gained the impression that some of those who have thought this test worth a trial, have not adopted it in its entirety, in other words have not stressed sufficiently the prolongation, or length of the period for which it is used, and in the second place the necessity for its continuity. These have been modified in some instances by reducing the period to a few hours or a day or two. Altho such tests may have a greater value than those lasting for a few seconds, or minutes only, they completely fail to give any reliable information as to the true muscle balance, and in fact may be misleading. The accompanying charts clearly demonstrate this.

It will be seen that in Chart 1, a low left hyperexophoria is temporarily converted into a low esophoria, later changing to a higher degree of exophoria. If the result of a test lasting two or three days had been accepted as representing the true muscle balance, a complete failure or an aggravation of the patient's symptoms would have been the result.

Again Chart 2 shows that several days had to elapse before any material relaxation took place, and a short test would have failed to be of any advantage to the patient. The truth is that when a short test brings out an error, it is a fair presumption that a longer test would bring out one of higher degree. The same chart shows that when a short test brings about no change, it is essential that the test should be prolonged.

A failure to instruct the patient as to the object and modus operandi of the test may result in indifference in carrying it out, and consequent failure to relieve symptoms. In one instance, which comes readily to my mind, the patient, who came on account of failure to obtain relief elsewhere, manifested some annoyance at having been subjected to an experiment (a prolonged occlusion test) which she didn't understand and which accomplished nothing for her. She accepted a repetition of it with eagerness when she understood it, and carried it out with care. The result was the conversion of an orthophoria into an exophoria of 11½° and a right hyperphoria of ¾°. The partial prismatic correction of these errors gave complete relief from a group of

nervous symptoms of many years standing.

In another case the patient had been instructed to wear the ground glass for "several hours a day" the result being a failure for the patient, and an opinion on the part of the doctor that "he did not think much of the test."

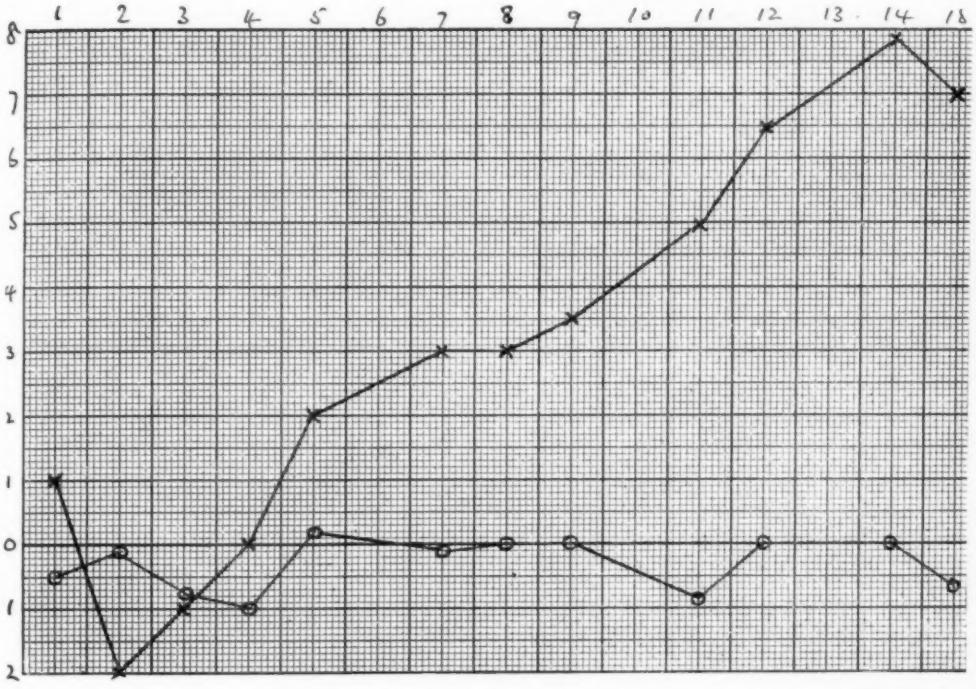

Chart 1. Figures at left show degrees of heterophoria, at the top days of occlusion. X above zero line means Exophoria, below it Esophoria. O, above the zero line means right hyperphoria, below it, left hyperphoria.

Such a proceeding is, of course, futile. The truth is, that, used for short periods and in an erratic or intermittent manner, the test is of low value, and must get into disrepute. Such tests, however, are not prolonged occlusion tests.

Again the hesitation to adopt this method on the part of a good many ophthalmologists seems to be due in part to its being a good deal of an ordeal to inflict on patients, many of whom are of a nervous type, and the improbability of its being carried out in the meticulous manner necessary for success. Speaking again purely on the basis of personal experience I find both these objections to be ill founded.

It is true that the test is not one for universal adoption—unfortunately. Unfortunately, because it leaves a number of cases, children too immature to carry it out and adults either with the mentality of children, or too indifferent or lazy to make an effort to help themselves. But with people of sufficient intelligence to understand it, and with a realization that all previous efforts to relieve them have failed, there is no difficulty whatever in securing an adoption and a proper carrying out of the method. It is most essential that the patient shall understand just why this method is necessary and that without it there is no means of ascertaining the true nature of the case. This can be done in very simple language. Once understood the patient of average intelligence accepts it without hesitation and often with eagerness.

In addition to modification of the degree and kind of heterophoria at 6 meters, the occlusion test often brings out marked changes in the balance at the near point (1/3 M.) and in the

ductions both lateral and vertical; and may also show variations in the distribution of the error over the field of fixation, making the determination of the particular muscle or muscles at fault much more definite.

First as regards changes in the heterophoria at the near point. The lateral balance is most commonly changed in the direction of more exophoria, or less esophoria.

Thus Mrs. W. B. R. (Case No. 7206); after a 7 day occlusion, exophoria increased from 5° to 9°, at 1/3 M, the same change taking place for distance.

Mrs. A. R. S. (3-11). Exophoria at 1/3 M, increased from 6° to 15°, there being no exophoria at 6 M, either before or after occlusion. A right hyperphoria ½° before, increased to 3° after the test, and a partial prismatic correction of it gave a high degree of relief from symptoms from which she had suffered all her life.

	Ex. increased at 1/3 M	at 6 M
Mrs. R. H.(65.112)	3 ° to 8°	2° to 5°
Mrs. C. R. R. (987)	4 ° to 11°	1° to 6°
Miss G. S. (3119)	6½° to 17°	0° to 8°
Mrs. A.L.S. (3246)	3 ° to 6°	3° to 6°

On the other hand there may be no change. Thus, Mrs. G. H. E. (74.190) showed no change for either distance or near after a 7 day occlusion. Or the change may be less for near than for distance. Thus Mrs. R. S. (9691) showed increase in exophoria of from 5° to 9° at 6 M, but only from 13° to 15° for near.

The inferences to be drawn from these observations seem to be; that a comparison of the near and far exophoria determined without an occlusion test is an unreliable basis for the management of the case, and that there is no definite relation between the distance and near exophoria. It is also noteworthy that in some cases in which a high exophoria develops at the near point, without much increase for distance, there is often a marked increase in the hyperphoria.

As has been previously pointed out (papers and monograph) there is no relation between the preocclusion prism abduction and the postocclusion exophoria. The latter may be and often is greatly in excess of the former.

Thus a patient whose preocclusion abduction was 5½° to 6½°, and exophoria 2°, showed after occlusion abduction of 12° to 13° and exophoria of 9°. This is an example of a very common experience and of the low value of preocclusion tests. As a matter of fact the preocclusion tests for abduction almost invariably underestimate it. Thus, of 53 cases in which abduction before and after is recorded, 43 showed an increase, in 9 there was no change, and in one it was less after than before. In some cases the change was very great, as from 4° to 11°, 6½° to 17°, 5° to 13°.

To repeat, the preocclusion abduction is often less than the postocclusion exophoria, and therefore a low abduction does not negative the existence of a high degree of exophoria.

Thus Mrs. W. B. R. (7206) had preocclusion abduction 8° to 6½° (i. e., 8° ascending, 6½° descending) and a postocclusion exophoria of 9°.

	Preocc. Abd.	Postocc. Ex.
Mrs. A. L. S. (3426)	4½°-3½°	6°
Miss M. H. (7868)	5 °-3 °	9°-10°
Miss R. M. (7752)	7 °-6 °	11°

It is worthy of note that a marked increase in abduction at the postocclusion test does not necessarily bring with it the development of exophoria, and this is not an uncommon experience.

More striking and of more importance, however, are the changes brought about in the sursumduction and deorsumduction. A careful study of these changes will fully repay the observer and help greatly in the final determination of the formula to be prescribed.

In the case of Mrs. N. C. (a 2) a 7 day occlusion brought an increase in R. hyperphoria from 1° to 2°+ there being no change in the lateral balance (deviation), which was esophoria 2° before and after. The hyperphoria was most marked in the upper part of the field and was equal on the two sides.

At the preocc. test the R. Surs. was 3°-1½° L. Surs. 1¾°-¾°. After occlusion, R. Surs. 3½°-2° L. Surs. 0° to 1°. At the end of the occlusion a prism 1° base down before the right, or up before the left, was necessary to obtain single vision. Or, to put it in other words, the patient was no longer able to overcome the hyperphoric tendency. Before the test the difference between R. and L. sursumduction was roughly 1°; after it, it was about 3°. Finally after the occlusion period the hyperphoria was definitely more marked up and to the right indicating an insufficiency of the left inferior oblique.

Mrs. J. H. T. (6824). An occlusion test raising the exophoria from 5° to 9° and an L. hyperphoria from 3° to 3¾°, was accompanied by the following changes in sursumduction.

	R. Surs.	L. Surs.
Before the test	1½° to 1°	3° to 2°
After the test	—3 ° to —4°	6° to 5°

In this case the difference between the R. and L. sursumduction was from ½° to 2° before, and from 8° to 10° afterwards, greatly emphasizing the importance of correcting the L. hyperphoria.

Miss R. B. (6980) at preocclusion test showed, exoph. 1°, at postocc. 3° to 4°. Preocc. Hyoph. 0, postocc. L. Hyp. 3½. Preocc. R. Surs. 2° to 1°, postocc. —½° to —1°. L. Surs. 2° to 1°, postocc. 5° to 4°.

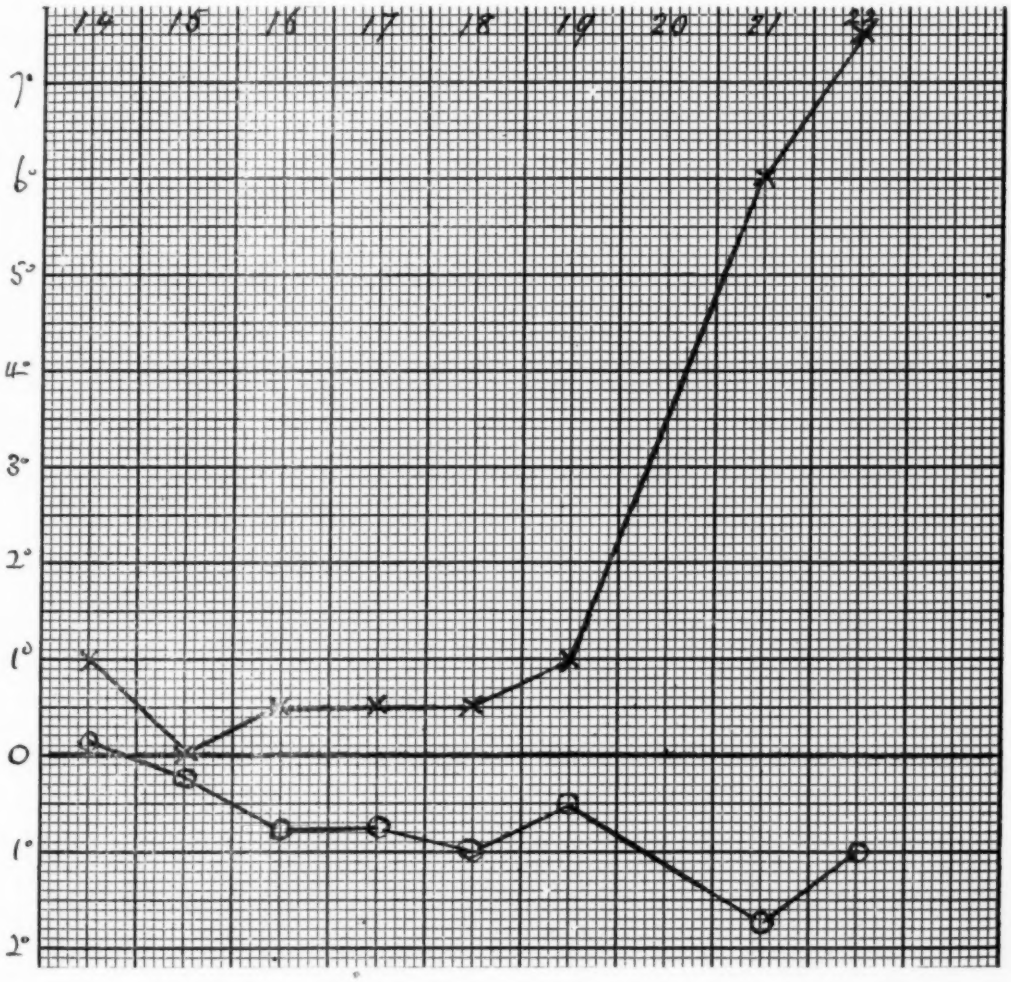

Chart 2. Delay in showing true heterophoria. X shows amount of exophoria. O shows hyperphoria.

In other words, before the test the vertically acting muscles seemed to be acting perfectly, but the tests brought out changes both in muscle balance and sursumduction, quite consistent with one another, showing conclusively that the preocclusion test was of low value.

No muscle problem can be adequately discussed without paying full consideration to the views of the late Alexander Duane. The perusal of a paper read by him at a recent meeting of the N. Y. State Medical Society makes it evident that the observer's point of view will be greatly influenced by the amount of experience he has had with the prolonged occlusion test.

A fairly large experience in the use of this test (over 1,000 cases) makes it impossible to agree with Duane's view that the deviation found is *"but a symptom"* and *"that perhaps the least important one of the conditions we are seeking to correct."* A condition which requires a physical examination, often lasting over many days, to demonstrate it, the detection and correction of which leads to relief from the subjective symptoms of which the patient complains, can scarcely be classed as a symptom; but should be classed rather as a physical sign and an etiologic factor, very often the most important in the case.

Duane states that complete relaxation or annulment of fusion activity would only be reached after many months which should produce a "return to the early infantile state in which *it is said* (the italics are mine) the eyes wander more or less without reference to one another." It is evident that Duane does not base this statement on his own experience, but on the alleged experience of others. I have observed many babies myself, and have never seen independently wandering movements, except in cases of bilateral blindness; and on inquiry from my obstetric acquaintances have failed to receive any corroboration of their occurrence. Nystagmus must come in a different category.

Just how long it would take for the contraction or spasm, due to fusion stimulus, to undergo complete relaxation actual observation alone could determine. It is a matter of somewhat common observation in carrying out the prolonged occlusion test for the error to become stabilized in the occlusion period, a week or two.

Duane seems to regard ocular equilibrium as a dynamic rather than as a static condition, and consequently his conception of orthophoria differs from that usually accepted. His point of view is somewhat perplexing. It would seem that a dynamic condition must have a starting point; in the case of muscles, the point of complete relaxation. When the extrinsic ocular muscles are completely relaxed the relation of the visual axes to one another depends upon the lengths of the muscles and their points of attachment. When these are such that in a state of complete relaxation the visual axes are parallel, we have what is commonly known as orthophoria.

According to Duane complete abolition of fusion control, if it could be accomplished, would result in "no stable condition to measure, i. e., no mechanically fixed position of the eyes, but an anomaly of opposing and originally varying entirely unregulated muscular tensions, causing the eyes to wander aimlessly and more or less independently just in this direction, just in that."

On the other hand there is a large group of cases in which total abolition of all fusion stimulus has existed for long periods of time, namely those people who have one eye entirely blind. It is a matter of common observation that in some of these cases the blind eye maintains its straight position; that in many it deviates, most commonly outwards, but sometimes inwards or vertically, but "aimless wandering more or less independently just in this direction and just in that" is not seen. In brief, these eyes appear to assume finally their relative position of rest and to maintain it.

Unless I misinterpret Duane, orthophoria in the commonly accepted sense of the term is in his opinion nonexistent. His conception of it does not clarify the situation. The identifica-

tion and measurement of any departure from the unstable and variable condition of equilibrium, which he describes, would be very difficult and uncertain. The conception does not harmonize with the observations made with the occlusion test.

Duane furthermore states that "prolonged occlusion is pretty sure to develop a convergence insufficiency." Actual experience does not support this statement. In the monograph before referred to, special reference is made to this point. In only 2 of 82 cases, in which the near point of convergence was measured before and after, was there more than 2 cm. increase. In 30 cases there was no change, and in 22 the distance was shortened. In fact such variations as occurred were within the normal limits of variation on different days. My experience since this was written has been of the same nature. The periods for which occlusion is used do not, as a matter of actual observation, produce a convergence insufficiency.

Duane lays great stress on the readiness with which the errors are demonstrated. Thus a "person whose fusion control is readily broken up even by a momentary application of the screen has an unstable equilibrium." "Those who have perfect and easy fusion control have much less disturbance than those with less manifest deviation in whom the fusion control is difficult or uncertain." That is no doubt true, but the occlusion test shows that there are numerous cases in which the fusion control is so perfect that no deviation whatever can be demonstrated by any of the short tests, and yet the symptoms, often of a severe and persistent type, prove to be due to a highly latent deviation, which can only be demonstrated by a prolonged test.

Dr. W. H. Fink, in THE AMERICAN JOURNAL OF OPHTHALMOLOGY, March, 1927, gave an interesting account of an investigation of the frequency of latent deviations in patients apparently quite free from symptoms of eyestrain and inferentially of their importance as etiologic factors of functional disturbance.

This paper calls for certain observations. In the first place, among the 35 cases presented, 14 sought advice on account of chalazion. Now chalazion is often the result of eyestrain, whether due to refractive error or muscle imbalance, and in many cases all that is required is relief from eyestrain. Everyone of these cases in Dr. Fink's series showed a marked muscle imbalance, and also, in all but two, a manifest ametropia.

With the same two exceptions every case in the series showed a measurable ametropia, and any conclusion drawn from the absence of symptoms applies to the influence or importance of ametropia as well as heterophoria. But the analogy is not complete, because the manifest ametropia only was determined. To make the investigation and analogy complete, the refraction under full cycloplegia should have been recorded also. Had this been done it is safe to say that a large proportion of these cases would have shown refractive error of important degrees. In other words, any inference drawn from the existence of latent muscle imbalance without symptoms applies equally to refractive errors, latent or not.

It is generally admitted that while even small degrees of astigmatism may cause distressing symptoms in some individuals, in others no recognized disturbance results from such errors, or even from errors of higher degree. The same holds true of muscle errors, and does not invalidate the importance of either form of error as a cause of trouble in a large number of cases.

In conclusion it may be proper to point out that the prolonged occlusion test has been advocated as a means of diagnosis only, for determining the presence of latent heterophoria, its kind and degree, and not as a direct therapeutic measure. Dr. O'Connor of San Francisco, who adopted the method as a result of his own original observations, and quite independently of myself, has evidently reached conclusions as to its value as a diagnostic method essentially identical with my own, and has used it in a larger number of cases

than I have. In his paper in the Transactions of the American Academy of Ophthalmology and Oto-Laryngology he summarizes the results and emphasizes the essentiality of the method for the study of the muscle balance. The discussion which followed is singularly free from any evidence of experience in its use, or of appreciation of its real value. Occlusion of one eye for the purpose of relieving symptoms due to manifest heterophoria, i. e. for therapeutic purposes, is quite another thing from the use of prolonged occlusion for the purpose of revealing latent error, i. e. for diagnostic purpose. As a matter of fact it has long been known that symptoms are relieved by shutting off one eye in such cases; and many patients adopt this procedure spontaneously, or automatically. Commonly when patients have a tendency to close one eye in a bright light, thus greatly diminishing the photophobia, it is presumptive evidence of a latent fault in the muscle balance.

University Building.

DIAGNOSIS OF LATENT VERTICAL DEVIATIONS OF EYES BY USE OF PROLONGED MONOCULAR OCCLUSION.

C. P. Clark, M.D.

INDIANAPOLIS, INDIANA.

The method of using this test and the indications for resorting to it are stated. Treatment may be prescribing of lenses, using vertical prisms, improving the patient's general health, permanent wearing of an occlusion glass, or operative procedures. Illustrative cases are given. It is conluded the test is of great value.

It is my intention to present some observations and conclusions in regard to the use of prolonged monocular occlusion in the diagnosis and treatment of hidden vertical deviations of the eyes. By prolonged monocular occlusion I refer to the covering of one eye for an extended period of time, thus interrupting the fusion impulse, and by this means permitting the eyes to take that position which requires the minimum amount of effort to maintain; which is the position of rest of the eyes.

The writings of Marlow, and later articles by O'Connor and O'Brien, have shown that many obscure cases of eyestrain are properly diagnosed and corrected only after the muscle balance has been studied by prolonged occlusion of one eye. In this paper I wish to give the essential points of a few illustrative cases in which this expedient was used, which made possible the understanding and correction of an obscure and persistent eyestrain which had not been properly diagnosed by the usual methods.

The majority of patients coming to the ophthalmologist for symptoms of asthenopia are relieved by the proper correction of the ametropia. A few are not relieved, some are even made worse. Those who are not relieved by a proper visual correction are usually found to have symptoms arising from some form of heterophoria, and it is with the latter group of patients that we find prolonged monocular occlusion of material aid in diagnosing and correcting the true muscle imbalance.

In the presence of heterophoria, single vision is maintained by the exact adjustment of the extraocular muscles under the stimulus of the fusion impulse; which requires one, or a group of the muscles, to be under an excessive contraction. Such a condition will in time produce a muscular spasm. The true heterophoria is then either hidden, or there is apparent one of false amount, or of kind.

When the position taken by the eyes under the minimum amount of effort is such that the visual axes are parallel for distant objects, true orthophoria is present. Many cases of apparent orthophoria, as shown by the usual tests, are not true orthophoria, as the position taken by the eyes under the minimum amount of effort will show various forms of heterophoria.

Many patients that are wearing their proper lenses for ametropia and are having symptoms of asthenopia, are found to have a hidden vertical imbalance. The apparent orthophoria is maintained by the stimulus from the fusion impulse, and there is an excessive effort made by one or more external ocular muscles. Since we have no drug that will act selectively upon the recti and oblique muscles, as do the cycloplegic drugs upon the ciliary muscle, we must resort to other (indirect and physical) means to relax the extraocular muscles. Temporarily suspending the fusion impulse by covering one eye for an extended time is the method employed.

The application of gauze dressing over the eye of lesser vision (even tho the difference be slight) leaving the better eye uncovered for use, was the manner in which all occlusions were made. Or, the patient might be asked to sight a distant object, and the eye chosen by the patient as the sighting eye be left uncovered. Care was exercised that no object was seen by the covered eye until the muscle test was made again, with the trial frame in position upon the patient. During the continuation of the occlusion, the dressing can be shifted to the other eye for a short while, such as several hours or a day, should the lids of the occluded eye give local discomfort such as itching and burning. This method of occluding one eye was chosen in preference to the using of an opaque glass in the patient's spectacle frame, or to the application of some opaque substance to one of the lenses such as adhesive, or paper, as there is then no possibility of the patient jeopardizing the examination by the use of the eye for a short period of time, as might occur with the spectacle glass covered.

The occlusion was maintained for different periods of time depending upon the convenience and necessity of the patient, but in all cases until apparent stability of the muscle test had been approached. In the majority of cases twenty-four hours was the length of application. A few tests have been carried longer than this, some as long as five days. Many of these patients expressed themselves as more comfortable with one eye occluded than they had been formerly with both eyes open. Short periods of time such as two or three hours have been very unsatisfactory in my experience; and of those cases that disclosed any error under such a short occlusion, there was always a large amount of manifest heterophoria under the common tests, such as the Maddox rod, cover, and parallax tests.

The muscle tests were made both for distance and near vision with the Maddox rod and double prism, and red glass over the fixing eye. I have found the heterophoria to be the same with either the double prism or multiple rod. The prism or rod was placed over the eye that had been occluded, and the red glass over the eye that had been used for vision during the occlusion, when making all postocclusion tests. The majority of these patients had been wearing lenses for their ametropia that were essentially correct; but they continued to have asthenopic symptoms. The ametropia was recorrected under cycloplegia and vertical prisms incorporated in the lenses.

According to my observation, prolonged occlusion should be employed:

I. In all examinations of the ocular muscle before any operative procedures are attempted, except in concomitant convergent strabismus.

II. In all refraction cases that come under the following groups:

1. Patients that are disturbed by moving objects, as when viewing motion pictures, riding on trains, or being in crowds, (for instance during the holiday shopping season).

2. All cases of persistence of asthenopic symptoms when the proper ametropic correction has been worn.

3. Those persons complaining of photophobia when wearing their glasses.

4. Cases in which a low amount of vertical, or a large amount of horizontal heterophoria, is disclosed by any of the common tests without occlusion.

5. Those persons in debilitated health who complain of ocular discomfort when wearing their proper correction.

Prolonged monocular occlusion should not be used as a routine procedure in refraction cases, but should be used in those cases which have unusual symptoms and complaints as enumerated in the above classes.

There is given at the close of this paper the essential points of a few illustrative cases in which prolonged monocular occlusion was used to detect a hidden vertical imbalance. In no instance have I found the convergence near point changed after the occlusion. In some instances a low amount of hyperphoria was increased in amount, or in others some was found to be present when none had been shown before the occlusion, and in a few the hyperphoria was changed from right to left, or vice versa.

The common chief symptoms complained of were first headache; then ocular vertigo (car sickness, crowd sickness, disturbance from moving objects, and a few were troubled when ascending or descending stairs); ocular fatigue; and some of nausea. The unusual complaints encountered were drowsiness when trying to read, epiphora, and an intermittent spasm of the orbicularis oculi muscles.

In a surprisingly few cases was any complaint made of diplopia and in those it was for short periods of time only. These cases always showed a high degree of manifest hyperphoria before occlusion.

Of course headache, ocular fatigue, and a certain amount of vertigo in astigmatic cases can be readily explained by ametropia. But when those persons are wearing lenses, which are approximately correct, and their symptoms are not greatly relieved, some other cause must be found for their discomfort. When those patients are found to have a hidden muscle imbalance, the correction of which relieves their suffering, it is safe to consider the muscle imbalance as the chief cause of their trouble.

Criticism of the employment of this method has been made on the grounds that many persons are found to show various forms of heterophoria, after having had one eye bandaged for several days, when in the beginning they showed no such heterophoria and had no symptoms of such. Also, within a short time after discontinuing the bandage the muscle test reverted to the former condition.

These persons are invariably found to be in excellent health. Many are employed in the trades that require good health and tend to keep them in such physical condition, as iron workers, machinists, bricklayers, etc. It is apparent in all medical work that the better the general health of the person the greater the handicap he can overcome without symptoms, especially when muscular in nature. Furthermore it will be remembered that those persons found to have their trouble due to a hidden deviation of the eye are persons who follow some sedentary occupation, and the general tone of whose body is not the best.

Likewise, many persons have some form of ametropia and no symptoms arise from it, because they are physically able to compensate for the handicap and their occupation is not such as to put an added burden on the eyes.

Also, objection to prolonged occlusion of one eye for uncovering hidden muscle imbalances has been made, stating that the muscle balance would tend to revert to an infantile state which would be unnatural to our present anatomic makeup. According to E. Treacher Collins and Wood Jones, during the evolution of the human body the eyes were at one time in a lateral position, and as later changes were brought about by the adaptation of the individual to a changed environment, the eyes were brought to an anterior position in the skull, binocular single vision then being established. It is quite impossible that in this evolution nature made the changes so exact, that the visual axes would be in perfect parallelism and on the same level, without necessitating some correcting effort by the external ocular muscles. And when the maintaining

of that effort by the external ocular muscles is painful, there then must arise reflex symptoms for the patient. It is these persons who are in reduced health, or who are leading an abnormally sedentary life, that seem particularly susceptible. In this type of patient, prolonged monocular occlusion does disclose the troublesome factor with the eyes, and the correction of that error does afford relief.

In this paper I have purposely omitted reference to horizontal deviations as disclosed by the occlusion, but would like to say that an exophoria has been found to be present in an overwhelming number. Symptoms from the exophoria were not observed when the vertical deviation was corrected, unless the exophoria was of high degree. The use of eye exercises for relief from the lateral deviations was found to be useful only in those cases that would be classed as divergence excess. Treatment for the hidden imbalance consists of:

I. Prescribing of the proper lenses to correct the ametropia.

II. Incorporating vertical prisms in the visual correction. In prescribing prisms the correction should be placed base down before the respective eye, unless there be more than two degrees; then divide the amount between the two eyes, but place the greater amount of the prism base down before the proper eye.

III. Improving the health of the patient by instituting whatever measures are required.

IV. When the deviation proves of abnormally great amount, prisms could not be worn comfortably to correct the entire error, or enough of it to afford relief; the operative procedures would have to be considered on one of the vertically acting muscles. Or, one eye could be permanently occluded by an opaque glass in the patient's spectacle frame.

As regards the cause of the deviation, in an occasional case I have been able to demonstrate, after occlusion, a paresis of one of the vertically acting muscles, by the colored glass, diplopia, and comitance tests. But in the majority no such finding could be made.

Case I. Female, age 34, teacher. Complains of severe frontal and occipital headaches for past fifteen years. Onset about noon, or middle of P. M., and markedly aggravated by any close work. There is some nausea when riding on trains or viewing motion pictures. Has been glassed a great many times since age of eighteen, by both oculists and optometrists. General health fair.

Wearing S. + 1.75 C. + 0.25 ax. 90°. Maddox rod; distance no hyperphoria; esophoria 1 degree. Near; orthophoria. Homatropin 5%: S. + 1.50 C. + 0.37 ax. 90° = 20/20. Occlusion, L. for 24 hours. R. H. 3 degrees; horizontal orthophoria.

℞ S. + 1.25 C. + 0.37 ax. 90° with 2½ degree prism base down. S. + 1.25 C. + 0.37 ax. 90°. Three months later the patient reported that she was free of headaches.

Case II. Female, age 30, housewife. Complaint; severe diffuse headaches, aggravated by any close work. Is markedly nauseated when viewing motion pictures, riding on trains, or when in crowds. General health fair. The only relief obtained is by total abstinence from any ocular work. She has worn glasses for three years.

S. — 0.50 C. + 1.00 ax. 90°. Maddox rod, distance L. H. ½; Exo. 1½. Near, L. H. ½; Exo. 9°.

Scopolamin 1/5%. S. — 0.75, C. + 1.25 ax. 90° both eyes. Occlusion L. 72 hours; distance, R. H. 2°; Exo. 2°. Near, R. H. 2°; Exo. 9°. ℞ S. — 0.75 C. + 1.25 ax. 90° with prism 2 degrees base down. S.—0.75 C. + 1.25 ax. 90°. The patient was relieved of her complaint.

Case III. Male, age 18. General health good. Has severe headaches, caused by reading or any other close work. Never wore glasses. Refraction under scopolamin gave, S. — 0.75 C. + 1.25 ax. 75°=20/15. S. — 0.75 C + 1.25 ax. 105°=20/15.

This was prescribed for continuous use. Eight months later the patient returned stating the headaches had been relieved by the glasses for five

months, after which time they returned with greater severity and frequency. The patient was again refracted under scopolamin and the same findings were had as before. There was orthophoria for near and distance. An occlusion test was made for 48 hours. There was then Exo. 5°, R. H. 2°. The right lens was changed to include the prism base down. The patient has been free of symptoms for one year, when he does not leave off the glasses.

Case IV. Female, age 36, nurse. Severe frontal headaches brought on by any continued near use of eyes. General health fair. She has been glassed several times during the past four years, but the headaches continue. Glasses discontinued 3 months ago. Distance, L. H. 1; Exo. 2. Homatropin 5%.

S. — 0.25 C. + 0.50 ax. 90°=20/15. C. + 0.75 ax. 90°=20/15, with 1 degree base down the binocular vision is better. Occlusion L. for 36 hours gave distance, L. H. 6°; Exo. 2°. Near, L. H. 6°; Exo. 4°.

℞ S. — 0.25 C. + 0.50 ax. 90°, with 2 degrees base up; C. + 0.75 ax. 90° with 2 degrees base down. The patient reported later that she could read for many hours at a time, and was free of any discomfort.

Case V. Female, age 20, college student. She has had severe headaches for several years, always associated with use of the eyes. The trouble became much worse after entering college. The patient is unable to ride on the train for any length of time, without becoming nauseated. When in a crowd of people she is troubled with the same complaint, develops a headache, and becomes nervous. Moving picture shows cannot be viewed with comfort. She has had many different pairs of glasses, during the past five years. The present lenses are S. + 0.75 C. + 0.75 oblique axis in each eye. Distance; Exo. I, no hyperphoria, with or without her glasses. Scopolamin cycloplegia gave Right S. + 1.12 C. + 0.87 ax. 120°. Left the same finding, with the cylinder axis 65°. A prolonged occlusion test, for five days, disclosed L. H. 5°, Exo. 8°. The ℞ was R. + 1.00, C. + 0.87 ax. 120°. Prism 2 degrees base up. L. + 1.00, C. + 0.87 ax. 65°. Prism 3 degree base down. Six months later the patient reported that she was nearly free of headaches, could attend moving picture shows with comfort, and very rarely became train sick. The glasses are worn continually.

IN CONCLUSION.

I wish to say that the use of prolonged monocular occlusion, in selected cases of persistent eyestrain, has been found by me to be of great value. It certainly is not a method to use as routine in refraction work, but is to be employed in those cases with abnormal symptoms and marked eye disturbance.

There is appended a bibiliography as I have found it in the literature on this subject.

503 *Medical Arts Bldg.*

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SUDDEN BLINDNESS AND OPTIC ATROPHY WITH CRANIO-PHARYNGEAL POUCH TUMOR.

GEORGE FREIMAN, M.D.

BROOKLYN, N. Y.

A girl of eight became blind in two days. The x-ray showed a normal sellar region. The optic discs were pale not swollen. Wassermann negative. Some headache. Seven months later there was papilledema and an arc of calcification above the sella. Tissue removed in an exploratory operation showed the structure of the tumor. From the Department of Ophthalmology of the Long Island College Hospital. Read before the Brooklyn Ophthalmological Society, February 17, 1927. See p. 624.

Ocular manifestations of pituitary disorders are many and varied, and sooner or later in the course of the condition bring the patient into the hands of the ophthalmologist. Visual field studies usually aid us considerably in diagnosing and localizing these lesions, and innumerable variations of the recognized characteristic field have been cited to put us on our guard in their recognition. We may, at times, however, be confronted with a patient at a stage in which no demonstrable field exists. The following case may reveal nothing that is new, and yet the clinical picture presented, when this little patient was first brought for examination, seemed to be sufficiently confusing to justify this report. Perhaps the report will bring out one or two points that will, in the future, lead to a speedier diagnosis of this type of condition.

CASE REPORT.

A female patient, 8 years of age, of Polish parentage, presented for examination on March 11th, 1926, with a history of having, more or less suddenly, completely lost her vision during the two preceding days, immediately following a convalescence from measles. Family history entirely negative. Patient was the eldest of 5 children, all of normal birth; the mother has had no miscarriages or premature births; the other children are all normal and healthy. Period of infancy of the patient was entirely uneventful; mother believed that she had always been somewhat underweight, but her general health had always been excellent. Her first illness was the whooping cough, during the summer of 1925; she was able to go about during the entire illness, which lasted for about 4 months.

During the early part of December, after she had recovered, she began to complain of headaches. As a rule they would be present when she awoke in the morning, but they might come on at any time of the day; dull in character and bitemporal in location; localized for several hours and accompanied by vomiting if she had eaten recently, vomiting evidently not definitely projectile. In this connection it might be mentioned that the patient would become nauseated and would vomit whenever she rode in a moving vehicle, a peculiarity her mother had noticed ever since patient was a very small child. Treatment for the headaches, by family physician, gave but temporary relief.

Next illness was the measles, in the middle of February, 1926; ill for three weeks. Course of the disease uneventful with no complications, followed by a comparatively sudden loss of vision during the two days she had been out of bed, first of the right eye then of the left, resulting in an inability to get about. At no time previously had she complained of any visual impairment; she believed that, until the present time, she had been able to see perfectly well.

Ocular examination at this time showed appendages normal, motility unimpaired, no exophthalmos, no nystagmus. Right pupil 7½ mm., widely dilated, no reaction to direct light, feeble reaction to consensual stimulation, questionable light perception. Left pupil 6 mm., intermittent, sluggish reaction to direct light, elicited only with light stimulus prolonged; perhaps one might have called it a delayed reaction; questionable reaction to consensual stimulation; some light perception. Media clear. Right disc

of uniform white color, very clearly defined, pigmented nasal margin, suggestion of lamina markings, tho they were not definitely visible; small vessels absent. Retinal vascular picture considered as normal. Left disc quite similar in appearance, clear cut outline; pallor, tho not so marked, was definitely uniform and presented the picture of atrophy; inferior conus. General physical examination showed a well nourished child, perhaps slightly undersized for her age; responded readily to questions and appeared to be of normal intelligence. Chest and abdomen negative. Neurologic examination by Drs. Browning and Perkins, negative except for increased knee jerks. Suggestive high arched palate, and high arches of feet.

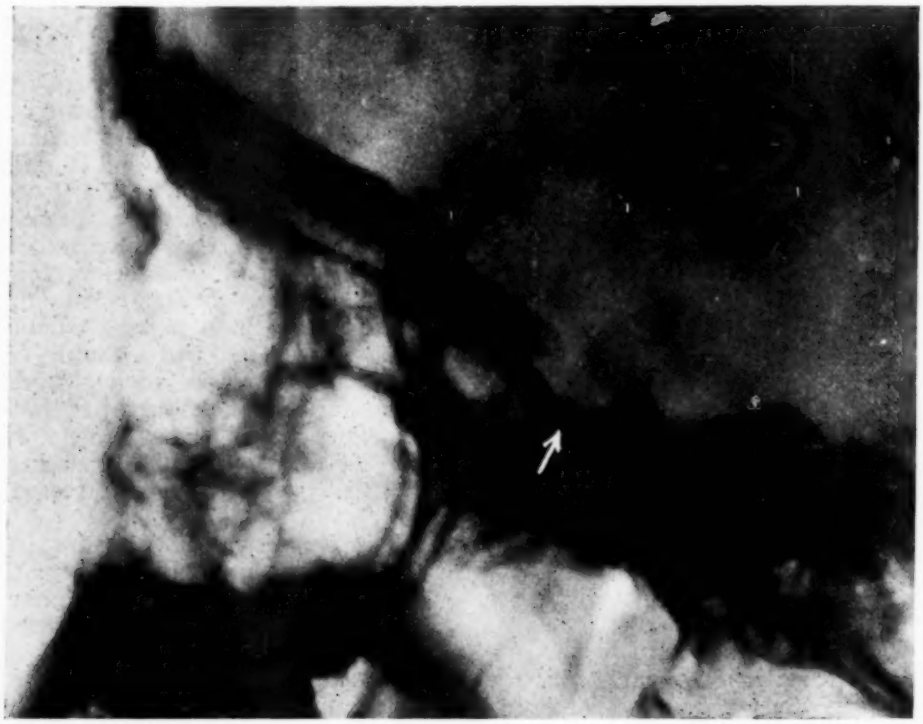

Fig. 1. Lateral view. Film taken in March, 1926, showing normal markings; well defined sella.

Retinal vessels normal, periphery of both fundi normal. Ocular opinion: Bilateral optic atrophy of primary type. Patient referred to the Long Island College Hospital for study.

We had, thus far then, a patient who apparently became totally blind during a period of two days, immediately following a convalescence from measles, with no previous history of visual disturbance; but who had been complaining of headaches for several months previously, associated with attacks of vomiting, and who showed, ophthalmoscopically, the picture of a well advanced bilateral primary optic atrophy.

Nasal examination: meati clear, but a sticky tenacious secretion thruout. Tonsils hypertrophic and definitely diseased. Stereoscopic films of the sinuses showed frontals, antra and anterior ethmoids clear, diminished aeration of posterior ethmoids and sphenoids on left side. Stereoscopic films of the skull and skiagraphic study of the apices of both orbits, negative; sella quite normal; blood vessels markings not unusually distinct; no evidence of increased intracranial pressure. (Fig. 1.) Intradermal tuberculin negative. Urine normal. White and differential count normal. Blood

Wassermann negative. Spinal fluid under no increase in pressure, cell count normal (6), Wassermann negative, colloid gold curve normal. Provocative blood Wassermann negative.

Temperature normal and pulse range between 80 and 90 for the greater part of the time while at hospital. Headaches not present every day and not severe; on the whole patient was quite

Fig. 2. Film taken 6 months later. Sella enlarged and eroded; area of calcification in arc above sella.

cheerful but would sleep a great deal. No great amount of significance was attached to this latter symptom, in view of her total inability to see about. She would feel nauseated at times and occasionally would vomit after taking some medication.

Tonsils and adenoids were removed. Altho there was no definite clinical evidence of sinus infection, the ethmoid and sphenoid cells were opened on both sides; pus was found in the posterior ethmoids on the left side. Detailed study by Dr. Givan for evidences of congenital lues revealed no positive stigmata except the high arches previously noted. Thruout this period no change had taken place in the eyegrounds except perhaps a slight deepening of the pallor with a suggestion of greenish tinge. Vascular picture remained normal. Patient could not with certainty tell the difference between light and darkness.

Here we had a patient apparently with a bilateral optic atrophy, sufficiently advanced from ophthalmoscopic appearance to make it appear almost inconceivable that this process had not been going on for a considerable length of time; and yet, from the standpoint of vision, patient evidently was not conscious of any impairment and the school records bore her out in this. Vision taken in Nov., 1925, several weeks before her headaches began, was recorded as 20/20 in each eye. We will concede that it was taken accurately. Her teacher stated that her school work, up to the time she was taken ill, in the middle of February, was above the average and

that she had noticed no evidence of deficiency in the child's vision. Of course, this is not at all inconsistent, if we assume that her visual fields had been contracting with good central vision remaining and that she had not been aware of an encroachment upon her fields; and yet, if this were a descending atrophy from pressure above, should we not have expected some proportion of disturbed vision, even central, long before the pallor of the discs became manifest? Cushing and Walker found a definite gradual diminution of central vision in their cases of pituitary pressure, corresponding to the stage of visual field deformity, the average vision being 20/70 to 20/200 at the stage of hemianopic blindness — one eye, however, usually considerably in advance of the other—and Fuchs quotes Benedict in stating that the pallor in these patients sets in some three or four months after the visual symptoms. Altho the symptom of blindness came on immediately after an acute infection, it was difficult to believe that that disease had any other than possibly an incidental role in its causation.

Fifield reported a case of a patient 9 years of age, with a negative previous history and with positive points of headache, nausea, dizziness and tinnitus, drowsiness and torpidity, progressive loss of central vision for over a year, primary optic atrophy, both sides, with resulting homonymous hemianopsia, X-ray showing separation of sutures of the skull, diagnosed as suprasellar pituitary tumor. Patient developed scarlet fever just before being admitted to the hospital, but findings for the most part had already been present. Operative exploration showed a number of adhesions around the chiasm with otherwise negative findings. A month later patient developed an acute chorea with fatal termination. Autopsy on brain showed no tumor. It was very difficult to account for the apparently well advanced optic atrophy and the field defects. Cushing's opinion was that there must have been, at some time, a local meningitis around the chiasm.

Granting the suprasellar tumors according to the observations of Cushing and Walker, are in many instances slowly progressive without particular discomforts, and that in many of the patients one or both eyes at the time of admission may have advanced well beyond the stage of bitemporal blindness; granting also that there is no relationship between the size of the sella and the implication of the nerves, tracts and chiasm and that, as Cushing has found, a superimposed tumor often surmounts a sella which gives fairly normal outlines to the X-ray, who would have presumed, without perimetric aid, to have made a diagnosis of suprasellar tumor in the case at hand, in the absence of some suggestive X-ray findings?

All other possibilities having been eliminated as highly improbable, attention was directed to the question of whether or not ours might be one of those rare cases of juvenile tabes, in which, according to Barkan, primary optic atrophy is an almost constant lesion and may be the only symptom of which the patient complains. To be sure, a high percentage of positive blood Wassermanns, with weakened or absent patellar and achilles reflexes also a prominent finding in Barkan's cases, made it rather venturesome to believe that this was one of that type. Altho the most constant lesion was present it was associated with repeatedly negative Wassermanns, active reflexes, and a definitely negative family history with negative Wassermann in the mother; associated also, however, with a very valuable and characteristic sign to which Traquair has called attention—the well developed pallor of the discs at the time when the patient first complained of visual failure. And yet, we should hardly have expected the initial complaint of disturbed vision to have been that of complete loss, unless perhaps precipitated in some way by the disease from which she was convalescing.

The patient was discharged from the hospital at the end of five weeks, and while being kept under further observation was given a full course of antispecific treatment. How futile were our efforts along this line may be

judged by subsequent developments. For many weeks after leaving the hospital the patient's appetite had improved markedly and she looked well. Headaches were not particularly troublesome and there was no definitely associated vomiting. The pupillary reactions, even in the right eye, seemed at times to be quite active, particularly under prolonged light stimulation. Optic discs became more definitely pallid and clear cut, the retinal vessels somewhat attenuated; no definite light perception.

The first striking change in the ocular picture was a definite fullness and tortuosity of the retinal veins of both eyes, which came on about six months after the patient left the hospital; the discs soon began to show a nebulous outline and gradually passed into a state of papilledema, the right slightly in advance of the left. By the time the mother consented to place the child in the hospital again, a month later, the right disc was elevated 5 diopters and the left 3 diopters. A very mild lateral nystagmus also become manifest at this time.

With the onset of eyeground changes, further X-ray studies of the skull were made, with the following report by Dr. Bell: "The sella, at this time, is seen to be definitely eroded and enlarged. There is a definite area of calcification extending in the arc above the sella. (Fig. 2.)* There appears to be some increase in the convolutional markings, particularly in the frontal region; vessel grooves are not unusually deep. The findings present are fairly typical of a posterior pharyngeal pouch tumor, developing rapidly according to the clinical findings. The films taken in March showed no evidence of calcification above the sella, and the sella itself appeared normal."

The patient was readmitted to the hospital Nov. 8, 1926; somewhat pallid, but still apparently well nourished, and not acutely ill. Chest negative, large adipose deposit on the lower abdomen. Senses of smell, taste and hearing intact, Babinski suggestive, knee jerks active.

Blood count: 12,000 white, 3,500,000 red, 70% Hb.

Urine negative, no polyuria.

Blood Wasserman negative.

Spinal fluid under pressure, cell count normal (7-10), Wasserman negative. Colloid gold, at this time, showed a luetic like curve.

Blood pressure 118/60, pulse range 70-90, temperature normal.

Anorexia marked, headaches quite constant, tendency to drowsiness, but mentally alert when awakened.

Surgical exploration was advised and after several weeks consented to.

Papilledema is a rare finding in these cases, even when pressure symptoms are pronounced; so rare in fact, that in a recent communication Cushing has stated that in the long run one would say that the presence of a choked disc spoke against a pharyngeal pouch cyst. It does occur, however, occasionally, when intracranial pressure has become extreme and the nerve sheaths have not become occluded by the growth. The rarity of this finding has been attributed to the fact that the nerve sheaths are almost invariably so blocked as to prevent the crowding down of cerebrospinal fluid.

When considering the possibilities of regaining some vision from operative intervention in this particular instance, it seemed rather unfortunate that it remained for the papilledema to lead the way to diagnosis. Repeated X-ray studies during the preceding 6 months might perhaps have revealed suggestive findings at least a short time before the eyeground changes became manifest. Had diagnosis been possible before the edema supervened, some measure of visual restoration from successful relief of pressure might have been looked forward to, because of the type of nerve condition that actually exists in these cases, provided pressure has not been of too long duration, despite the ophthalmoscopic appearance of atrophy. However, even this complication of superimposed edema would not have entirely eliminated the possibility of some visual restoration.

*Cushing's studies have revealed that it is possible, with present day technic, to demonstrate this telltale shadow in fully 80% of the cases of craniopharyngeal pouch tumor.

Tilney has cautioned us to remember that the optic nerves contain none of the potentialities of regeneration and recuperation common to peripheral nerves; that when an atrophy is once established it is permanent; that you may arrest further progress but you can never produce any improvement in an actually existing atrophy. With the characteristic pallor of advanced atrophy and the perimeter an advanced field defect.

"It is often impossible to tell from appearance of the disc whether or not there has been an irrecoverable destruction of the nerve, and dependence must usually be placed on the preservation of pupillary reactions and on

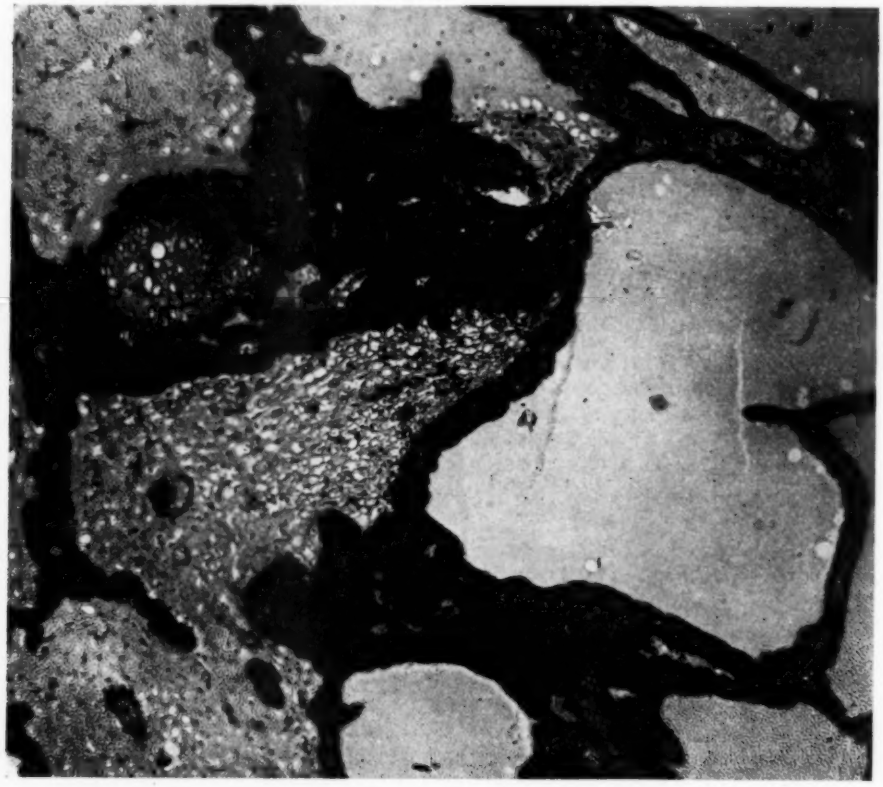

Fig. 3. Section of cyst wall. Adamantine epithelioma of hypophyseal duct. Mucoid degeneration of stroma.

this in mind, the observations of Cushing Walker, which follow, assume an added significance.

"In view of the prompt restorations in the field outlines which may follow operative relief from pressure, it is evident that the socalled primary optic atrophy often does not represent an actual anatomic degeneration so much as a physiologic block to the transmission of visual impulses. In several cases the histologic examination of nerves showed but a scattered degeneration even tho the ophthalmoscope had previously demonstrated the retention of some light perception, no matter how dim.

"From a surgical standpoint, the superimposed tumors are far less favorable than the others, and consequently there have been fewer notable instances of postoperative improvement in perimetric conditions." For the reasons that "the mere evacuation of the contents of the cyst gives only temporary relief, and extirpation is very often impossible because of the adherence of the calcareous wall to surrounding structures."

Notes of cerebral exploration by Dr. Emil Goetsch: Right frontal approach, dura extremely tense. Ventricular needle, introduced into the right lateral ventricle also entered the cyst, which apparently lay directly beneath the frontal lobe; about 40 c.c. of a thick, greenish, sticky material removed; dural flap cut, right frontal lobe retracted, large cyst could be seen situated in the region of the tuber cinereum with the right optic tract traversing the outer aspect of its midpart; mass partially collapsed, wall red in color and about 4 or 5 mm. in thickness; contents not entirely fluid; solid tissue projecting from, and calcareous deposits in, the wall. Poor condition of the patient necessitated rapid closure of the wound at this point. Fatal termination, no autopsy.

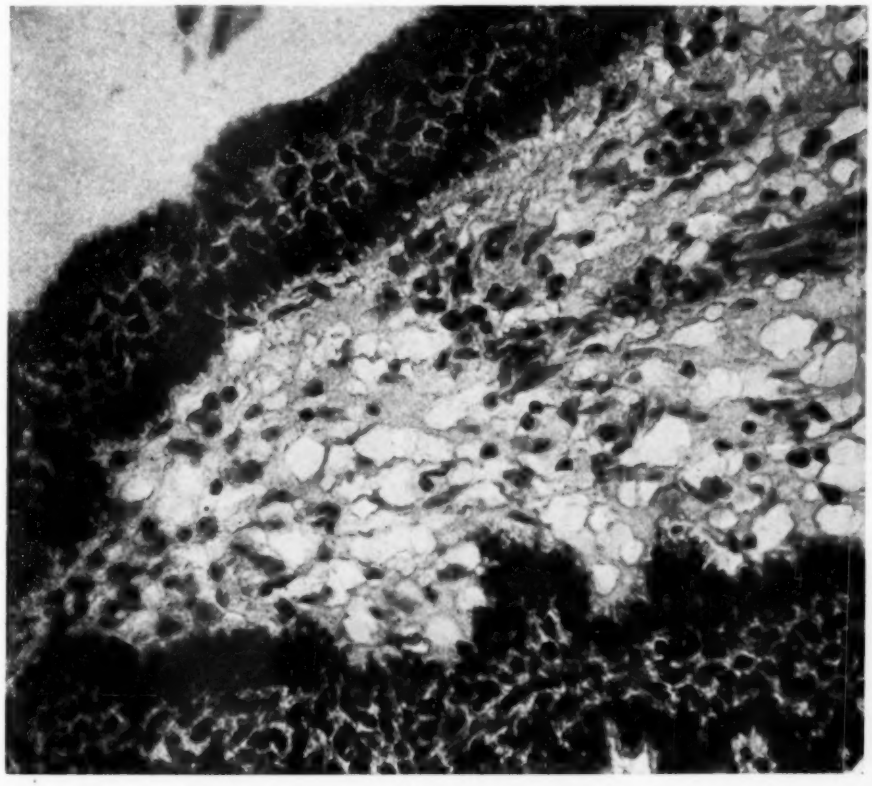

Fig. 4. Area of same section under greater manification, showing border of compact columnar elements.

Microscopic study of a section of the cyst wall, by Dr. Murray, revealed it to conform in structure to the adamantine epithelioma type of tumor. A striking feature was the presence of many small cystic areas lined by compact columnar elements. (Figs. 3 and 4.) The cysts of this type of tumor, Ewing states, may contain serous fluid, or mucus, or inspissated fatty and scaly material; calcific deposits are common and yield a characteristic X-ray picture; the epithelial cells exhibit all variations in form between stratified squamous and specialized enameloblasts; the stroma may be very dense or cellular. These growths fall in the general class of carcinoma, tho they do not form metastases.

Extrapituitary tumors of this type, as Erdheim was the first to exphasize, may be traced to the remnants of the hypophyseal duct, developing from epithelial cells at any point along the course of this embryonal structure, from the lingual process of the anterior lobe which encircles the stalk above almost to the optic chiasm, from Rathke's cyst between the anterior and

the posterior lobes, beneath the hypophysis in the floor of the sella or the sphenoidal spaces, and in the wall of the pharynx at the entrance of the duct. These cells, from which epithelial growths or cysts might be expected to arise (and it would be well to keep in mind that they might develop at any age), presumably represent "rests" of the primitive ectodermic diverticulum.

The location of the tumor in this case would perhaps suggest its origin from the hypophyseal stalk, lying above the hypophysis and compressing below; its structure shows definitely the relation that it bears not only to the pharyngeal epithelium, but also to that type of epithelium thru whose active agency the enamel of the tooth is produced.

703 Grand St.

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ACQUIRED ECTROPIUM UVEAE.

ALGERNON B. REESE, M.D.

NEW YORK CITY,

Four types of uveal ectropion are defined, but this paper deals with the form commonly seen in pathologic eyes, especially glaucoma. It is based on a study of twenty cases and describes in detail the anatomic conditions observed. To explain the changes contracture of a membrane on the anterior surface of the iris, atrophy of the iris and proliferation of its pigment epithelium are all essential.

When the black pigment epithelium extends from the pupillary border on to the anterior surface of the iris the condition is known as ectropium uveae. The following types of this condition are recognized:

1. Physiologic. This is the pigment seam seen on a normal iris around the pupillary circumference. The condition, of course, is not very marked but becomes slightly more manifest when the pupil is contracted.

2. Congenital. This occurs as an aberration in development, or closure of the ocular cleft, and is associated with an incomplete, or complete coloboma of the iris.

3. Traumatic. This type cannot be properly classified as a real ectropium uveae. Two such cases appear in the literature. One case was reported by von Praun and resulted from a contusion of the globe which caused the pigment epithelium to be torn away in one sector of the iris. This flap of pigment epithelium which was completely detached except at the pupillary border passed thru the pupil and lay on the anterior surface of the iris. As expressed by von Praun it was "like a carpet laid out of the window." The other case was reported by Hack, and was identical to von Praun's except the injury, instead of being a contusion, was a perforation by a piece of straw; and probably at the time of the perforation the detached flap of pigment epithelium was washed thru the

pupil and remained on the anterior surface of the iris, attached at the pupillary border.

4. Acquired. This is the type of ectropium uveae which we are accustomed to see in pathologic eyes, and particularly in glaucoma. Only this type will be considered in this paper.

A summarized account of the microscopic study of twenty cases of acquired ectropium uveae will first be given.

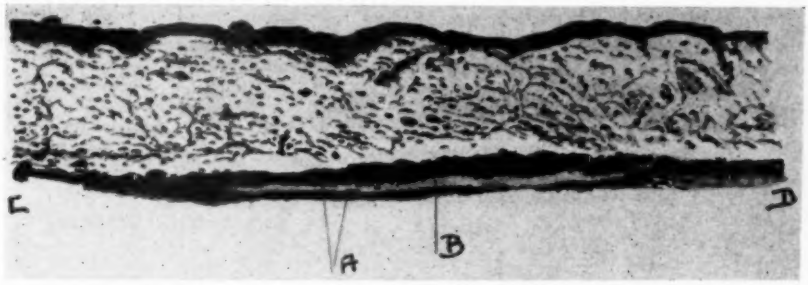

Fig. 1. Section thru the iris, showing the ectropionized pigment epithelium on the anterior surface, lying both anterior and posterior, A, to a membrane. B, Iris stroma shows atrophy. C, towards pupillary border of iris. D, towards periphery of iris.

Extension of pigment epithelium on to the anterior surface of the iris was, of course, present in every case. Sometimes it extended for equal distances, and sometimes for unequal distances around the entire pupillary area. In other cases it appeared in only one sector of the iris, while the remainder of the pupillary circumference was free. In some cases the pigment extended for a short distance on to the anterior surface of the iris, while in others it covered the entire anterior surface. The individual ectropionized pigment epithelial cells were flatter than normal, but the thickness of the layer varied a great deal; at times it was several layers and again a single layer. Rarely cysts appeared between the pigment layers.

There were other signs of proliferation of the pigment epithelium, such as masses or nodules of pigment, cells on the posterior surface of the iris (Fig. E), some of which were attached to the surface and some of which were free in the posterior chamber. Also, these proliferated cells could be seen migrating thru the iris stroma (Fig. 1). Rarely the ectropionized pigment epithelial layer was lying both anteriorly and posteriorly to a membrane on the anterior surface of the iris (Fig. 1.) The pigment epithelial cells usually showed degenerative changes in various forms, such as swelling, edema, rarefaction, or dispersement of pigment. An ectropion was never seen at the site of a posterior synechia. However, rarely at these sites the pigment epithelium had proliferated over on to the anterior capsule of the lens.

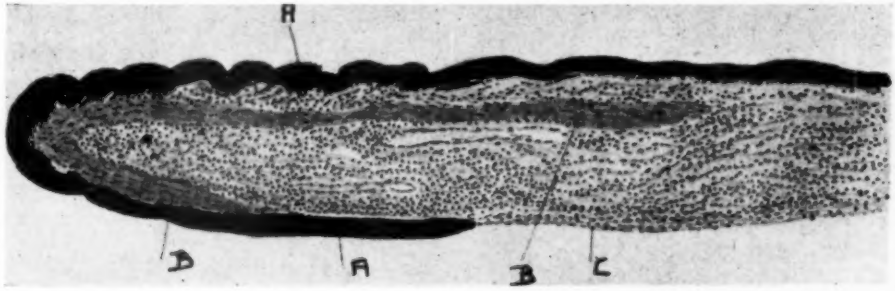

Fig. 2. Section thru pupillary area of iris, showing ectropion of the pigment epithelium, A, and the sphincter muscle, B. The latter is hypertrophied to at least twice its normal dimensions. Iris stroma shows atrophy. There is no membrane on the anterior surface of the iris C. No dilator mucle is seen because it has undergone atrophy towards its pupillary circumference.

Increase of intraocular tension was present at the time of enucleation in 12 of the 20 cases, or in 60 per cent. The histories of three of the remaining eight cases state, that severe pain preceded the loss of vision which lead to blindness, which is suggestive of high tension having been present. All of these eight cases showed microscopically peripheral anterior synechiae, which is further evidence of there having been increased tension.

branching chromatophores had disappeared (Fig. 2). No surface markings such as crypts or contraction furrows were present. Usually the stroma was interspersed with pigment globules some of which were migrating pigment epithelial cells from the posterior surface, some clump cells, some phagocyted pigment and some chromatophores which had taken on a globular shape.

There was no particular scarcity of

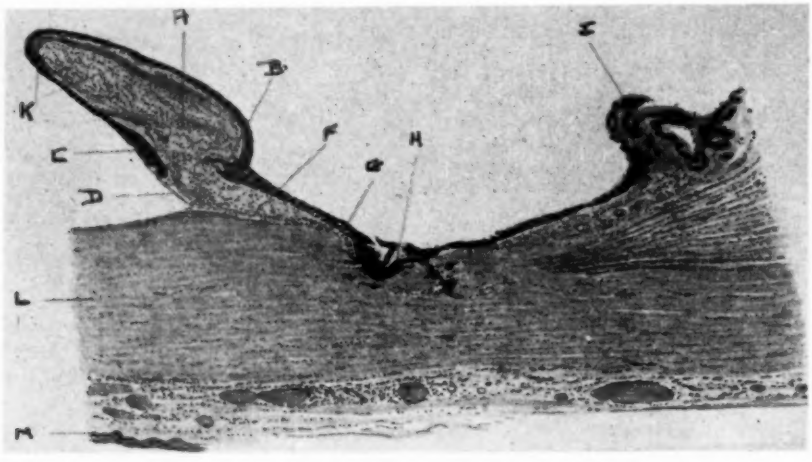

Fig. 3. This iris A is reduced to a small stump thru atrophy and shrinkage. The latter is shown by the fold at B. The ectropion of the pigment epithelium, C, covers almost the entire anterior surface. A thin membrane is seen on the anterior surface of the iris at D. The pigment epithelium shows proliferation at C. There is a broad peripheral anterior synechia at F and the periphery of the iris, G, is almost completely atrophic and pushed into the dilated internal scleral sulcus, H, which is a forerunner of an intercalary staphyloma. The ciliary body and processes, I, show atrophy. The sphincter muscle K is hypertrophied and ectropionized. L is cornea and M is epithelium of the limbus.

Ectropion of the sphincter muscle was seen in every case, but to a much less degree than that of the pigment epithelium (Fig. 2 B and Fig. 3 K). The sphincter very often showed a hypertrophy, both as to width and thickness, and rarely to such an extent that its size was twice that of normal dimensions (Fig. 2). The sphincter was never seen ectropionized more than half its width. Therefore, the dilator muscle never took part in the ectropion, but on the contrary often appeared to have undergone an atrophy towards its pupillary border.

The stroma of the iris showed an atrophy (Figs. 1, 2 and 3) in the sense that the iris was thinner than normal and composed of rather dense meridionally coursing fibrous tissue, in which most all of the delicately

blood vessels. In only three cases could one definitely say that there were arteriosclerotic changes. However, many cases showed a thick hyalinization of the adventitia but no more than one is accustomed to see in the iris blood vessels. Except for the presence of a few lymphocytes and plasma cells, only two cases showed an inflammatory reaction in the iris stroma, both of which were of a chronic nature. One case was a spontaneous iridocyclitis (Fig. 2) with secondary glaucoma and the other case was tuberculosis of the uveal tract. Sometimes the iris was club shaped at the pupillary margin, giving the impression that it had been doubled on itself. However, the increase in the thickness of the iris at the pupillary border was not a constant finding; and this ap-

pearance may have been simulated, because of the fact that in glaucomatous eyes the periphery of the iris is relatively thinner thru atrophy (Figs. 3 and 4).

The iris was usually of about normal width. However, the more marked the ectropion the narrower the iris; so that in cases where the entire anterior surface of the iris was covered by the pigment epithelium, the iris was usually composed of a short rather thick stump (Fig. 3). The shortness of the iris in these cases was due to (1) the contracture of the fibrosed atrophic iris, (2) the shrinkage of the iris as described by Fuchs, whereby the membrane on the anterior surface contracts and draws the iris into folds (Fig. 3 B), and (3) the pushing of the root of the iris into a beginning intercalary staphyloma (Fig. 3 H). This last is brought about as follows: The high tension dilates the internal scleral sulcus and pushes the iris root into it, thereby shortening the length of the iris. If this condition develops further, an intercalary staphyloma appears.

Peripheral anterior synechiae (Fig. 3 and 4) were present in 19 of the 20 cases, or 95 per cent. The case which did not show it was one of glioma with secondary glaucoma. Usually the periphery of the iris was thinned (Figs. 3 G and 4 G).

A fibrous membrane on the anterior surface of the iris (Figs. 1, 3 and 4) was seen in 18 of the 20 cases, or 90 per cent. The two cases in which it was not present were both primary absolute glaucoma (Fig. 2). The membrane was composed apparently of simple fibroblastic tissue in which frequently there was, irregularly coursing, but more often concentrically coursing, blood vessels. In some cases the membrane was thick (1 mm.) and in others it was thin (one or two cells thick). Even in the same case the thickness varied, the thickest portion being located usually towards the angle of the anterior chamber.

Very often there was a well marked endothelial layer, covering the surface of the membrane and in continuity with the endothelium on the posterior surface of the cornea. In a few cases there was a second membrane, between the fibrous membrane and the endothelium, which simulated Descemet's membrane in appearance and staining properties; and in one case particularly it was as thick as Descemet's membrane (Fig. 4 C). Usually the fibrous membrane extended to the ectropion-

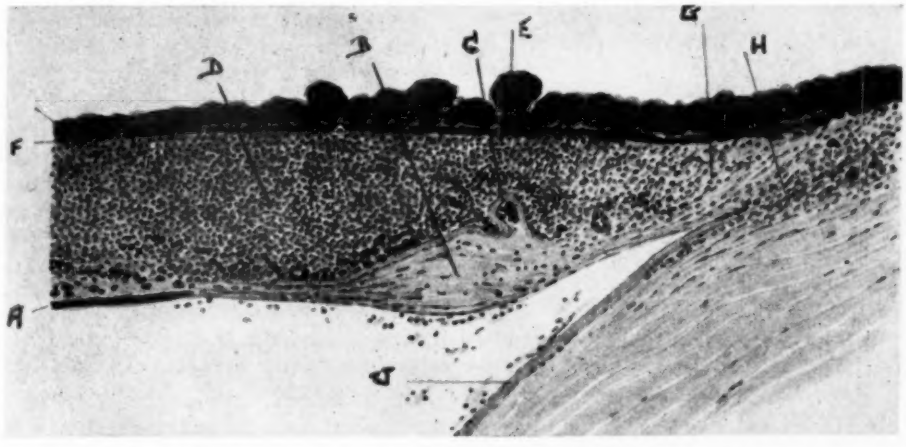

Fig. 4. Section thru periphery of iris. The peripheral end of the ectropionized pigment epithelium is seen at A. A dense, thick, fibrous membrane, B, lies on the anterior surface of the iris; and behind B lies another membrane, C, which is hyaloid and resembles Descemet's membrane in character. This latter is thrown into folds by the contracture of B. The iris stroma, D, is densely infiltrated with lymphocytes and plasma cells, as this was a case of spontaneous iridocyclitis with secondary glaucoma. The pigment epithelium on the posterior surface of the iris shows nodules of proliferation at E. The dilator muscle is shown at F. Iris shows particualr atroply at its periphery, which is in apposition to pectinate ligament at H, causing peripheral anterior synechiae. Descemet's membrane of the cornea is shown at J.

ized pigment epithelium but at times it extended under and at times over the pigment epithelium. In one case the pigment epithelium was found both anterior and posterior to the membrane (Fig. 1 B). In one case the membrane near the periphery of the iris was composed of several layers; the most posterior one which was lying on the surface of the iris was in folds and the successive layers anterior to this less and less so (Figs. 4 B and C). Under these membranes the iris could be seen drawn up into folds. This case is interpreted as meaning that there have been successive membranes laid down, each of which has contributed successively to its share of the contracture.

Detachment of the retina was present in 16 of the 20 cases, or 80 per cent. In the subretinal space over the detached area was the usual eosin staining albuminous fluid, in which proliferated pigment epithelial cells were suspended. Also, the pigment epithelium covered by this albuminous fluid showed proliferative changes, such as nodules of pigment cells, raised fibrous like plaques of pigment, epithelial tissue and drusen like changes. Free hemorrhage in the vitreous, anterior chamber or posterior chamber, was present in 12 of the 20 cases, or 60 per cent. The amount and extent varied from hemophthalmos to small traces. Some of the 8 cases in which no hemorrhage was found showed suspicious remains, or traces of a previous hemorrhage having been present; such as phagocyted pigment, in and around organized membranes, with the characteristics of hematogenous pigment; also, organized membranes, in eyes in which there were no inflammatory changes present, and in which there were no traces of an inflammatory reaction having been previously present.

The literature on acquired ectropium uveae is fairly extensive, which in itself is an indication of the fact that there has been contention over the pathology concerned. A review of this literature shows that the explanations advanced to explain ectropium uveae may be divided into three main groups, as follows:

1. A membrane extends along the anterior surface of the iris from the pupillary border to the angle of the anterior chamber; and by its contracture the nonfixed point, or pupillary border, is pulled towards the fixed point, or angle of the anterior chamber. This is an analogous condition to cicatrical ectropion of the lids. This view was first advanced by Knies, and later upheld by Deutschmann, Birnbacher and Tschermak, Weinbaum, Zirm, Wehrli, Alt, Redslob, Friedenberg, Lohman and Adam. Michel held the same view except that he thought the membrane, instead of being composed of fibroblastic tissue, was composed of endothelium from the endothelium on the anterior surface of the iris.

2. Following an inflammatory edema of the iris the stroma undergoes an atrophy. As a result of this atrophy, in which the pigment epithelium does not participate, the stroma shortens; thereby causing a disproportion between the length of the pigment epithelium and that of the stroma, resulting in an extension of the pigment epithelium on to the anterior surface of the iris. This view was held by E. Fuchs.

3. The pigment epithelium of the iris proliferates and thereby extends over on to the anterior surface. This explanation was first advanced by Gallenga and later championed by Siegrist and Stern.

Thru the study of the 20 cases of ectropium uveae reported in this article the writer feels that no one of the three aforementioned explanations suffice to explain all cases, but that all three processes are usually at work to produce the ectropion of the uveal pigment. The evidence which warrants this view is as follows:

1. The contracture of a membrane on the anterior surface of the iris:

A. Is perhaps the greatest factor in producing ectropion because;

a. 90% of the cases show a definite membrane.

b. This membrane and the iris show wrinkles as a result of the contracture.

c. The club shaped appearance of the pupillary border of the iris is evidence that it has been doubled forward.

d. The fact that the ectropion never occurs at the site of a posterior synechia is evidence that the iris is pulled forward.

B. Is not the sole factor in producing the ectropion because:

a. There are cases with absolutely no membrane present.

b. The ectropion does not appear more marked and more frequently in the lower half of the pupillary area, where organization of exudates and hemorrhage in the dependent part of the anterior chamber are more frequent.

c. The sphincter muscle is so little ectropionized as compared to the pigment epithelium.

There are three ways possible for the membrane on the anterior surface of the iris to originate:

1. From proliferation of the endothelium on the anterior surface of the iris. This is highly improbable, because the membrane resembles simple fibroblastic tissue and we know of no behavior of endothelium elsewhere in this manner.

2. From an organization of exudate on the anterior surface of the iris. Ectropion uveae occurs in glaucomatous eyes in which there has been no inflammatory exudates and certainly no plastic exudates, the organization of which leads to the formation of membranes. If inflammation and its accompanying exudation were a factor in the production of the membrane, then we would expect posterior synechiae to be produced also and therefore no ectropion.

3. From the organization of hemorrhage on the anterior surface of the iris. The writer feels that this is the origin of the membrane; because the presence of hemorrhage could be demonstrated microscopically in 12 of the 20 cases, and suspicious traces of it having been present could be seen in most of the other cases. This is a very striking finding; particularly in view of the fact that there are good chances for any hemorrhage present, or any traces of a partially absorbed hemorrhage not to be included in the sections studied. Also, in view of the fact that hemorrhage can be rapidly absorbed or organized. The possibility of the hemorrhage seen in some of the cases having been produced at the time of enucleation must be taken into account.

It is not uncommon to see a thin, and sometimes perfectly smooth and symmetric layer of blood, along the anterior surface of the iris, which sometimes can be seen in the actual process of forming a membrane thru fibroblastic organization. Sometimes clinically when no hemorrhage is seen in the vitreous, anterior chamber, or elsewhere in the eye we see a greenish tinge to the iris and by means of the slitlamp we see red blood cells in the aqueous and blood on the anterior surface of the iris. Apparently small, undetected hemorrhages, or diapedeses, can occur in the eye and make their way to the anterior chamber. Here they are thrown by the circulation of the aqueous in the anterior chamber, which moves downward anteriorly and upwards posteriorly, against the anterior surface of the iris to which they adhere. Red blood cells and especially phagocyted red blood cells (megaloblasts) seem to have a certain affinity for, or a tendency to agglutinate to the anterior surface of the iris. Blood on the surface of a relatively normal iris is very quickly absorbed. However, when the iris is atrophic, as is always the case in ectropium uveae, blood on its surface is obsorbed very slowly. Furthermore, blood absorbs very slowly in a glaucomatous state, which is or has been present practically always in ectropium uveae. In the literature six authors have written on ectropion in socalled hemorrhagic glaucoma, which indicates a connection between hemorrhage and ectropion.

2. Atrophy of the iris can be of two types: (1) A uniform thickness of the iris thruout its entire width, with the stroma composed of somewhat dense, straight, meridionally coursing fibrous tissue, in which are few or no chromatophores. This type gives clinically the dull, grayish "blotting paper" appearance and does not transilluminate.

It has been described thoroly by E. Fuchs. (2) a rarefaction of the stroma or disappearance in a greater or less degree of the cellular, fibrous and vascular elements which allows the iris to be transilluminated and in more marked cases leads to formation of holes in the iris. The first type is an atrophy with proliferative reaction, and the second type is a pure atrophy without proliferative reaction. The former type is the one associated with ectropium uveae, and:

A. Is a factor in producing the ectropion because, (a) It is present in every case. (b) The pupil is always dilated clinically and microscopically. The iris is narrower and thinner than normal, thus allowing a disproportion between the iris stroma and the length of the ectropionized pigment epithelium. The anterior surface of the iris is sometimes completely covered with pigment epithelium and so short that clinically it is almost hidden from view by the limbus. Certainly in such cases and those of less degree, the atrophy and consequent contracture has played some role in the ectropion.

B. It is not the sole cause of ectropium uveae because: (a) This same type of atrophy is seen often in the presence of no ectropion. (b) In cases of ectropion in which this atrophy is present the iris is sometimes of normal width, and shows no sign of having shortened thru contracture.

This atrophy of the iris in cases of ectropium uveae is no doubt due to interference of the blood supply by increased intraocular tension. In glaucomatous eyes there is unquestionably an embarrassment to the blood circulation of the iris. This is manifested very strikingly in the microscopic examination of the eyes having suffered an acute rise of tension, in which it is common to see varying degrees of necrosis of the iris, more usually in the pupillary one-third of the iris and extending at times even to the root. Therefore, the writer feels that if sudden high tension can cause a complete necrosis of the iris, then a more chronic and lower tension can cause an embarrassment to the blood supply of the iris, sufficient to produce a proliferative atrophy which one sees in glaucomatous eyes. The intraocular tension probably interferes with the iris circulation at the root of the iris, in the neighborhood of the major circle. In chronic glaucomatous eyes there is also a thinning of the root of the iris; and, rarely, even to the extent of forming a hole or iridodialysis. This tendency, combined with the anterior peripheral synechiae, perhaps contributes towards the interference with the circulation from the major circle to the iris.

3. Proliferation of the pigment epithelium and thereby its extension on to the anterior surface of the iris.

A. Is a factor in the production of ectropium uveae because: (a) The ectropionized pigment epithelium is composed of many layers in some places and single layers in others. (b) The length of the pigment epithelium, from the root of the iris posteriorly to its termination on the anterior surface of the iris, is long enough, if detached, to reach to the opposite side of the pupil. (c) Sometimes the membrane on the anterior surface of the iris has pigment epithelium both anterior and posterior to it. (d) Proliferation of the pigment epithelium is to a greater or less degree found in glaucomatous eyes and sometimes in glaucoma iridectomies or trephines, the pigment proliferates around the coloboma pillars, or iridotomy opening. Also, in glaucoma pigment epithelial cells migrate thru the iris stroma into the anterior chamber as a result of proliferation. In these cases of ectropion it was fairly common to see mounds and villi of proliferated pigment on the posterior surface of the iris. (e) Proliferation of the pigment epithelium is a very common reaction in the eye and seen in a diversity of conditions such as: (1) On to the capsule of a secondary cataract. (2) On to the capsule of the lens following an iridectomy in cases of chronic iritis. Of course in this case, proliferated pigment must be distinguished from pigment left on the capsule as a result of

posterior synechiae. (3) Flap of pigment epithelium becomes displaced into the anterior chamber and there proliferates into a larger mass or cyst. (4) On to the anterior lens capsule in the presence of posterior synechiae.

B. Is not the sole factor in the production of ectropium uveae because: (a) It does not explain the ectropionization of the sphincter muscle which is practically always present. (b) One would expect the pigment epithelium to occasionally proliferate on to the posterior surface of the cornea, especially in those cases in which the pigment covers the anterior surface of the iris to the filtration angle. (c) One would expect the ectropion to appear even in the presence of posterior synechiae, or at least at the sites of the pupillary circumference not affected by the synechiae.

CONCLUSIONS. The pathology of ectropium uveae does not consist of any one of the three explanations advanced, but a combination of all three, to wit:

1. Contracture of a membrane on the anterior surface of the iris.
2. Atrophy of the iris.
3. Proliferation of the pigment epithelium.

Due acknowledgment is accorded Professor A. Fuchs for his kindly interest and suggestions.

50 W. 52nd St.

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CHANCRE OF CONJUNCTIVA WITH PARENCHYMATOUS KERATITIS.

S. J. MEYER, M.D.

CHICAGO, ILL.

Two cases here reported were observed in the University Eye Clinic of Professor Elschnig, at Prag. They are brought into relation with the statistics of similar cases recorded in the literature. The complicating corneal inflammation was observed in both.

Chancre of the conjunctiva is of interest because of its rarity, the usual obscure method of infection given by the patient, and the difficulty of early diagnosis.

Saemisch in 1904 noted 50 cases in the literature, while Wolfrum and Stimmel, in 1910, added 21 cases to the previous number. They classified the location of the chancre as follows: 23 on the bulbar conjunctiva, 6 on the plica and caruncle, 11 on the upper fornix and 24 on the lower fornix.

It is interesting to note the percentage of eye chancres to the total number of extragenital chancres and to the number of cephalic chancres. The statistics of the different writers reveal a great variance. From the large statistics of Münchheimer, chancres of the eye are in seventh place, after lips, breast, mouth, fingers, hands and tonsils. In 10,265 extragenital chancres, the eye was affected 463 times (4.15%). As a whole, chancre of the eye is of rare occurrence. Wilbrand and Staelin saw no eye chancres in 200 eye affections, occurring in the early period of syphilis. Following this, Hahn saw no chancres in 307 extragenital chancres occurring in 16,616 cases of syphilis. However other writers, especially in Russia, have found the percentage of eye chancres to be very high, viz.: Posey-Korschitz, 130 eye chancres in 888 extragenital chancres. Terson found 8 lid chancres in 15 years, Wolfrum and Stimmel, 2 in 5 years, and Igersheimer, 5 in 8 years. Fournier noted 21 eye chancres amongst 849 cephalic chancres.

MODES OF INFECTION.

Quite often the patients do not know the cause or mode of infection. This can be easily understood, because in many cases the patient does not know definitely, or cannot recall what occurred three to four weeks previously. On the other hand many patients are reluctant to state the exact cause. Usually kissing, and in Russia, the habit of licking foreign bodies out of the eye, are the most frequent causes. In other cases it is the contagious secretion that strikes the eye; and occasionally, infected liquor amnii. Very rarely infected laundry. Occasionally, but very seldom, autoinfection, where the patient himself transplants the virus from his own genital lesion, within the first few days of its occurrence, before he develops an immunity. It is also believed that eyes already suffering from disease are more easily disposed, as in blepharitis, impetigo of the lid skin, inflammation of the Meibomian glands, conjunctivitis and trachoma. This is especially noticeable amongst suckling infants and small children. Occasionally a primary chancre on both eyelids has been observed.

The modes of infection reported in the literature are both interesting and enlightening. Igersheimer in 1912 reported a case in a woman who had been struck in the eye by the tail of a cow four weeks previously. This, of course, was not the exciting factor. Denti observed a case in a woman who had nursed an infant with definite syphilitic lesions. Hantke's patient reported the presence of an iron splinter in the eye. Simon's case occurred in a young doctor who had the misfortune to examine the throat of a patient with mucous patches while she coughed, thereby receiving infected droplets of secretion in the eye. Another mode of infection as stated by the patient is noted in the following report.

CASE 1. Miss Marie S., white, age 23, factory worker, was admitted to the eye clinic Nov. 30, 1926. She stated

that three weeks previously a fellow worker had accidentally touched the right lower lid with a burning cigarette. This, however, could not be the actual cause. Three days later, the right eye became red and swollen, accompanied by considerable pain. Since November 16, 1926, she had been treated by a doctor at Carlsbad, who observed an enlargement of the cervical glands. The treatment consisted of drops and boric acid wash daily. A blood Wassermann taken at this time was negative. She also noticed a decrease in vision during the same period, a definite hoarseness and nightly headaches.

The past history regarding previous infections, abortions, pregnancies and habits was essentially negative. The patient was of medium stature, well developed, definitely hoarse, and had a definite indolent, painless, submandibular, pre- and subauricular lymphadenopathy. Temperature 38° C. Physical examination except as noted was negative.

Vision R. E. 6/24?, no improvement with glasses. Vision L. E. 6/6, same with + 0.5 sphere. Javal R. E. plus 0.5 cyl. ax. 90°. L. E. plus 0.5 cyl. ax. 90°. Both lacrimal sacs were patent and not swollen. Tension: Schiötz, R. E. 1/5, L. E. 1/5.

Findings of R. E. On the conjunctiva of the upper lid, near the tarsal border, and extending upon the fornix in its outer third, which is definitely swollen but pale, there is found an infiltrated mass, about 4 mm. in diameter, dark red in color, with sharp irregular demarcated borders. The pale infiltration of the bulbar conjunctiva extends lower down across the conjunctiva of the fornix; so that the entire bulbar conjunctiva has a definitely bluish-pink color and is moderately chemotic. The anterior chamber is deep. The slitlamp examination of the cornea, Nov. 30, 1926, revealed a very slight clouding or haziness of the epithelium, accompanied by diffuse, fine, punctiform opacities in the parenchyma, limited to the region of the limbus.

On Dec. 8, 1926, the cornea was practically clear and normal again. The iris stroma and color was good, the pupil maximally dilated and did not react to light or accommodation. The dilatation was due to atropin instillations received in her previous treatment in Carlsbad. The lens was clear. The fundus examination revealed a papilla of good color, with sharp borders. There was a physiologic excavation, accompanied by a pigmented conus located on the temporal side. The macula was clear. The right papilla, definitely redder than the left. The left eye was essentially negative both externally and ophthalmoscopically.

Dark field examination made from the serum in the infiltrated mass revealed the presence of spirochetes. Nose and throat examination was essentially negative. Right antrum puncture revealed no pus. Blood Wassermann reaction one week later, Dec. 6, 1926, was four plus.

The patient was transferred to the skin clinic of Prof. Dr. Kreibich, where she received seven intravenous neosalvarsan and five intramuscular bismuth injections, from Dec. 3 to Dec. 27, 1926. The infiltration and chemosis gradually disappeared on the above mentioned treatment, and the eye had a normal external appearance at the time of her discharge from the hospital, Dec. 27, 1926.

Case 2. In connection with this case I shall also record a second case of chancre of the conjunctiva, which was observed in this clinic in 1909.

Anna P., age 24, white, was admitted to the eye clinic May 26, 1909, on account of a persistent inflammation of the left eye of eight days duration. A definite swelling was noticeable on the under lid of the left eye, most marked in the lateral half, where the lid appeared thickly infiltrated thruout its entire thickness. In the lateral part of the fornix, extending medially to the center, laterally and superiorly beyond the external canthus, including about 2 mm. of the conjunctiva of the upper lid, there was observed a somewhat bloody jagged ulcer, 2 mm. in diameter, with a yellowish-green covering. The bordering conjunctiva was strongly and diffusely reddened, ac-

companied by a slight edema of the upper lid. The preauricular lymph glands were definitely enlarged. Blood Wassermann was weakly positive May 5, 1909, with a negative Klausner Reaction. Slide preparations made from the ulcer by the skin clinic of Prof. Kreibich revealed many spirochetes. This case was probably one of the earliest known in which the above information was obtainable.

The etiology as given by the patient was a probable contact with a relative, who had been suffering from a severe lues.

While undergoing mercury rubs, there appeared on June 1, 1909, a cloudiness and dotting of the epithelium on the lower corneal margin with the finest punctiform opacities in the parenchyma, which extended over the entire cornea during the next few days. On June 13, 1909, the cornea was already clear, but at the time of examination on June 17, 1909, there were still visible delicate punctate and striate gray spots thruout the entire corneal parenchyma, while the other parts of the eye again appeared normal. The patient did not afterwards return for further observation.

COMMENT.

The pathology of a chancre as a whole is a circumscribed lymphocytosis. The epithelium over the swelling is destroyed by vacuolization and cell infiltration. Histologically it is characterized by an envelopment of the vessels by lymphocytes, as noted by Sourdille, and Wolfrum and Stimmel. The blood and lymph vessels are encircled by five to six rows of lymphocytes, which occasionally attack the intima, altho the adventitia is the part most usually affected. There may even be a desquamation of the endothelium of the moderately large blood vessels. The small blood vessels and capillaries are most often occluded. In the submucosa is noted a coagulated serum, containing cell masses. Besides lymphocytes, Wolfrum and Stimmel found plasma cells, leucocytes, mast cells, and connective tissue cells. It appears as new granulation tissue. Spirocheta pallida is usually present in the secretion.

The prognosis is usually good. The chancre heals readily, except that by its cicatricial contraction, deformity of the lids may occur. If it is present on the skin of the lid, only the scar is left; if situated on the lid border, the cilia may be permanently lost; if on the conjunctiva, usually only a scar remains. In rare cases complications may occur, due to the cicatricial contraction, as destruction of the puncta lacrimalis, Lapersonne, or symblepharon, Aubineau.

Occasionally it may be followed by a tarsitis of the upper lid, when present on the upper fornix, or excrescences on the sclera, when situated on the bulbar conjunctiva. It is interesting to note, that in both of our cases there was observed a concurrent development of a unilateral interstitial keratitis.

The development of a parenchymatous corneal infiltration with a conjunctival chancre has been known for a long time. In 1912 G. Baer noted in the literature 98 cases of chancre of the conjunctiva, from which only 22 were situated on the lower fornix and lid and reported 3 of his own cases. To this number I can add 9 more cases situated on the lower fornix as noted in the literature, and 8 on the upper fornix. Terrien was probably the first to observe this corneal complication.

Without considering the rare cases of direct extension of a syphilitic affection from the bulbar conjunctiva into the cornea as a diffuse marginal infiltrate, there usually occurs in the greater number of cases a fine to punctiform infiltration of corneal parenchyma as mentioned in our two cases. Clausen believes these infiltrates are due to the action of toxin; and means by this, that thru the acute destruction of the spirochetes by salvarsan therapy there is produced an overwhelming toxemia in the conjunctiva and cornea.

This opinion is based on the ground, that in his case the infiltration set in after the antiluetic treatment was started. This is, however, not the rule. In our case first described, the corneal

changes occurred before the commencement of any antiluetic therapy, as it also did in the accurately observed case reported by Wolfrum and Stimmel, while in our second case reported, the corneal changes occurred too soon after the mercury rubs were started for the therapy to have had any effect upon the spirochetes.

Corneal affection following conjunctival chancres appears to be characterized by a smallness of the efflorescence; and, in spite of Igersheimer's experimental findings in rabbits' eyes, Elschnig believes that in these cases there is a direct spirochetal invasion into the small infiltrates.

Bourgeois, Ginsburg and Fournier have observed cases of iritis developing soon after the appearance of the chancre. One rarely sees an affection of the uvea, as reported by Comninos and Marcoglan, who observed an ulcer of the cornea accompanied by vitreous opacities so dense, that it was impossible to obtain a view of the fundus. Baer observed a case in which the chancre was followed in three weeks by a haziness of Descemet's membrane, and later severe vitreous opacities, neuroretinitis with scotoma, and parenchymatous keratitis with deep vascularization. Some writers believe it may predispose the patient to cerebral lues.

The therapy consists of energetic antiluetic treatment by the use of neosalvarsan injections intravenously, combined with mercury, either in the form of inunctions or intramuscular injections, and intramuscular bismuth injections. The old method of excising the chancre and instilling calomel in the conjunctival sac is obsolete, as it usually leads to bad cosmetic results, and does not attack the spirochetes systemically.

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DRY STERILIZATION FOR EYE INSTRUMENTS.

WILLIAM C. FINNOFF, M.D., D.Oph., F.A.C.S.

DENVER, COLORADO.

Sterilization of surgical instruments by this method has been little used outside of France. In laboratory work it has proved reliable. Two years' use of it has proved it very satisfactory for ophthalmic operations. Read at the Sectional meeting, American College of Surgeons, Pueblo, April 3, 1927.

Outside of the bacteriologic laboratory, dry sterilization is rarely used. France seems to be the only place where it is employed for sterilizing surgical instruments. In a survey of our popular text books on general and special surgery, I find no mention of it; and the only reference to it in current literature and the index medicus is an article by Dr. Robert Amory in the Boston Medical and Surgical Journal of 1909, and another in the Dermatologisches Centralblatt of 1904.

The practicability of this method of sterilization of surgical instruments was first brought to my attention while visiting the Morax Clinic at the Hospital Lariboisière in Paris. Morax, an eminent bacteriologist and ophthalmic surgeon, had, thru careful experimentation and study, found it to be the most satisfactory procedure for sterilizing the delicate instruments used in eye surgery, and has adopted it in his clinic. It is also used by a number of French general surgeons. It seems strange that this method has not been used more universally.

Unless one is operating in an eye hospital, where an operating room personnel of trained ophthalmic nurses is available, one can never be certain that one's instruments will not be ruined, or will be sterile at the time of the operation. Our knives must have a perfect point and a razor edge; our scissors must be faultless; and our forceps with delicate teeth must work perfectly and be free from rust. You can all visualize what would happen if a set of cataract instruments were handed to the operating room nurse of an average general hospital for sterilization. I have had perfect cataract knives ruined as they were moved on the operating table after I had carefully carried them thru carbolic acid and alcohol and arranged them on the instrument table. Similar difficulties must be encountered by surgeons in other fields.

The usual method of sterilizing cutting instruments by carbolic acid and alcohol is not always safe, because of insufficient exposure of the instrument to the disinfectants. It is not an uncommon practice for nurses to simply dip instruments for an instant in both solutions and place them on the operating table. If the instruments are greasy, the carbolic acid will not reach the metal, the alcohol might not dissolve the grease, and the instrument will remain contaminated when it is handed to the surgeon. Instruments that are boiled are wet and often rust before they are ready for use. In any event a dry polished instrument is much more desirable in all branches of surgery. Where practicable, dry sterilization removes all of these objections, and one can begin with a perfect confidence that his instruments are absolutely sterile.

An infection of the eye following an intraocular operation is a very serious complication, and in the great majority of cases, results in blindness of the operated eye. The inflammation is always associated with excruciating pain and the end result is a shrunken and unsightly eye, with the lurking danger of sympathetic ophthalmia if an enucleation is not done. One experience of this kind is enough to stimulate any conscientious surgeon to seek the most perfect surgical technic.

For about two years I have followed the method employed by Morax for sterilization of my instruments that are used in intraocular operations and operations on the ocular muscles. It has entirely eliminated the apprehension of finding damaged or contaminated instruments. The knives remain polished, the point uninjured, and the

edge sharp. The instruments are dry and free from rust, and in perfect working condition. They remain in sterile containers, unexposed to air contamination until immediately before the operation, when they are removed and placed on the table.

The knives are fixed in holders, which are placed in corked test tubes. The other instruments are arranged in metal boxes, which have tight fitting covers. Hypodermic syringes, that have been previously dried and the plungers inserted into the barrels, are placed into corked test tubes. Each container is wrapped with two layers of heavy wrapping paper and labeled. The instruments in their containers are then placed in an electric sterilizer that is automatically controlled by a thermostat, which keeps the temperature at 160° C (320° F). The exposure should be for one-half hour at this temperature. They are then removed and one can feel assured that all organic life has been killed.

The paper covers prevent the entrance of dust. At the time of operation the paper is carefully removed and the sterile containers handed to the surgeon, who can open them when he desires.

Amory used an ordinary heating plate with a three heat control. He covered the copper heating drum with a tight fitting tube which opened into the bottom of an asbestos lined oven. He controlled the heat with the regulator, and by observing a thermometer that was placed thru an opening in the top of the oven. We have employed the Freas automatic electric sterilizer, that is manufactured for bacteriologic laboratories.

Amory, with the aid of Professor Samuel C. Prescott, of the Massachusetts Institute of Technology, carried on a series of experiments to determine the efficacy of dry sterilization. They used contaminated orange wood sticks, such as are used by surgeons for cleaning their nails before operations, and found that prolonged soaking of the sticks in formalin and other disinfectants did not render them sterile; while exposure to dry heat from 121° C. (250° + F) to 149° C (300° + F), for forty minutes, destroyed all spores and did not injure the wood. A much shorter exposure will destroy all bacteria, provided no spores are present. Fine tempered steel wire and watch springs were not affected by temperatures that destroy spores.

For the sterilization of hypodermic syringes and needles used in obtaining blood and cerebrospinal fluid, this method of sterilization is ideal. Dr. Edward Mugrage, Professor of Clinical Pathology at the University of Colorado, has been using it regularly for this purpose and finds it decidedly more convenient than the method that he formerly employed. The needles retain their sharp points and never rust, if properly cleaned and dried before sterilization. Scalpels, probes, and other instruments can be sterilized in convenient containers and kept on hand in a sterile condition, ready for immediate use in emergency operations, at the office or elsewhere.

There is no reason why sets of instruments used in general surgery should not be sterilized in this manner. In fact, Miss Nelson, the nurse in charge of the operating room at the Colorado General Hospital, recently said after we had finished an operation, that she wished that all surgical instruments were sterilized in the same manner as ours.

The only objection to the method that I can see is the necessity of having more than one set of instruments, if a second operation of a similar character is done the same day.

217 *Imperial Bldg.*

AMAUROTIC FAMILY IDIOCY.

HARRY S. GRADLE, M.D., and M. L. FOLK, M.D.

CHICAGO, ILLINOIS.

Among 36,000 admitted to Children's Department of Michael Reese Hospital were 12 cases of this disease, the basis for this paper. No plausible theory as to its etiology has been advanced. Observed facts regarding it are reviewed, as found in the literature and as illustrated in these cases.

The first case of amaurotic family idiocy was reported by Waren Tay, a London ophthalmologist, in 1881 under the title of "Symmetrical Changes in the Yellow Spot in Each Eye of an Infant." Within the next three years, he found two more cases in children closely related to the first case reported, and one case in another family. In 1887, Sachs, unaware of the Tay reports, published a paper entitled, "Arrested Cerebral Development," wherein he described the symptom complex and reported the autopsy findings, minus spinal cord and eye examination. Kingdon was the first to correlate the conditions described independently by Tay and by Sachs. In 1896, Sachs recognized the familial element of the disease and proposed the name of amaurotic family idiocy, altho Heigier's suggestion of "Tay-Sachs Disease" has attained wide recognition. In 1917, Martin Cohen was able to collect one hundred cases of this disease from the published reports in the literature and since then numerous cases have been added. Undoubtedly, an even greater number of recognized cases have never been published.

This study is based upon the 12 cases of amaurotic family idiocy that were entered in Michael Reese Hospital from 1909 to 1926 inclusive. During this period, the admission to the Children's Department numbered about 36,000, so that this disease represents 0.03% of the total admissions. Of the 12 cases, 11 were of Jewish parentage and 1 Gentile. 7 were girls and 5 were boys. The youngest case was 10 months old and the oldest was 34 months, the average on admission being 14½ months. In only 3 cases was there a familial trait demonstrable; in 2 families there was one other child affected and in the third family, 2 other children suffered from the same disease. The symptoms were noted in two children at birth; in 7, they appeared between 3 and 6 months of age, in 1 at 7 months, and the other 2 at 8 months. 4 patients died in the hospital and autopsies were performed upon 2 of them. 2 others died immediately after leaving the hospital. The remaining 6 cases were lost to sight and could not be traced by the Social Service Department.

The symptoms presented were practically the same in all cases; poor physical and mental development so that the child was unable to walk, sit upright, or even hold up its head; very restricted movements of the extremities; reflexes either exaggerated or diminished, with positive Babinski or ankle clonus in some; inability to talk and absolute lack of interest in the surroundings. The blood Wassermann was negative in all of the cases. The fundus examination was made in 10 of the 12 cases and presented the well-known typical picture of amaurotic family idiocy namely; a snow-white area of the retina extending from 1 to 3 disc diameters in all directors from the macula, in the center of which is a cherry red spot, 1/4 to 1/5 disc diameter in size. Furthermore, 6 of the 10 cases examined showed more or less optic atrophy. In one case, the fundi were normal in every respect, and in the oldest case seen, there was only secondary optic atrophy, without any changes in the macular region, detectable.

The posterior half of the eyes were obtained in both of the autopsies, but the macular region was not sectioned in the first. The remainder of the retina showed an absence of the ganglion cell layer and a thinning of the nerve fiber layer. The optic nerve

was also very thin and showed an increased amount of fibrous tissue stroma. The choroid and sclera were normal. The second case was studied more minutely and serial sections were made. As in the first case, the essential pathology was found in the ganglion cell layer of the retina. The cells were few and widely separated and showed as large bodies, sharply outlined and composed of finely meshed, faintly stained material. The nuclei, when present, were eccentrically placed, with indistinct margins and with a diffuse washed-out appearance. The outer molecular layer was about one-half as thick as the inner. The other retinal layers were normal and the optic nerve was atrophic. The entire nervous system showed a marked degeneration of the ganglion cells.

These pathologic details agree in the main with those reported by Holden (who was the first to examine the eye histologically in this disease), Hirsch, Schaffer, Hassin, and others. In the exhaustive work of Hassin on the histopathology of amaurotic family idiocy, it is claimed that the upper nuclear portion of the ganglion cell harbors normal Nissl bodies, while the lower portion of the cell body shows a chromatolysis of a prelipoid or lipoid nature. The optic thalamus was chiefly involved. No edema of the retina was found by any observer, contradicting former beliefs.

In view of the pathologic findings in the ganglion cell layer, the macroscopic fundus picture can be explained easily. In the normal eye, at the foveal margin, the ganglion cell layer increases in thickness, being six to ten cells deep, while in the fovea proper, ganglion cells are practically absent. About 1 disc diameter from the fovea, the layer is about four cells deep and two disc diameters away, it is only two or three cells deep. The alteration in size and shape of the ganglion cells in amaurotic family idiocy gives the snowy-white appearance to the retina, in those areas where the ganglion cells are numerous; that is, one of three disc diameters around the fovea. The fovea proper, having no ganglion cells, is not altered in color and hence stands out as a vivid red in contrast to the surrounding white retina.

Etiologically, amaurotic family idiocy is still an unsolved mystery. Among the predisposing factors that have been discussed may be mentioned the following:

(a) Familial tendency, inasmuch as frequently several children in the same family are affected. J. Epstein reported a family in which 4 of the 8 children died of this disease.

(b) Race. It is most commonly found among Hebrews, and in the beginning, Sachs considered it a disease of the Hebrew race exclusively. But in recent years, quite a few cases have been reported in other races.

(c) Blood relationship of the parents. This has been considered seriously, but there have been too many cases reported in children whose parents were not consanguineous.

(d) Trauma to pregnant mothers. In the light of modern investigations, this falls into the same class as prenatal mental influences.

(e) Neurotic Taint. A term that like charity covers a multiple of sins. but offers nothing concrete.

(f) Toxemia of child. J. Epstein, noting the striking resemblance between hypoparathyroidism and amaurotic family idiocy, suggested that the cause of the latter might be a toxemia from the gastrointestinal tract as a result of abnormal metabolism of calcium salts, initiated by a dysfunction of the parathyroids. G. Marinesco considered that pathologic changes in the intracellular ferments might be responsible for the disease. He explained the familial character of the disease by diastasic activity of the mitochondria. In a later publication, he stated that the course of the capillaries is strewn with glycogen granules, and that an intimate relationship seems to exist between the gravity of the lesion and the deposit of glycogen.

As a matter of fact, no even plausible theory as to the etiology of amaurotic family idiocy has yet been advanced.

At first, Sachs thought that the dis-

ease was a developmental anomaly, while Schaffer considered it a degenerative process. Both later changed their views. Hassin concluded that the changes were primarily congenital and secondarily degenerative, the primary changes consisting of an aplasia in which part of the cell remains undeveloped and lacking in Nissl substance. Some of these undeveloped cells degenerate, causing secondary degeneration and reactive glial phenomena. Schaffer practically agreed with this view and pointed out that the changes must be endogenous since they involve only ectodermal cells and are extensive in their distribution, spreading to dendrites and cell bodies.

Vogt first described the socalled juvenile type of amaurotic family idiocy in 1905, and his followers considered it a distinct clinical entity. The principal differential points between the juvenile and the infantile types of disease are as follows:

(a) The juvenile type occurs later in life, appearing at times as late as fourteen or fifteen years of age.

(b) It is found most frequently in Gentiles.

(c) There are no changes in the macular retina, the only abnormality being optic nerve atrophy.

(d) Histologically, degenerative changes are found in the rods and cones and in the outer layers of the retina as far as the inner molecular layer.

H. W. Torrence, who wrote extensively upon the subject, came to the conclusion that the two types are but minor variations of the same disease, because:

(a) Cases of infantile type have been reported without macular changes, as first described by Weber. One case in the series here reported corroborates this point.

(b) Some families have shown both types (Heigier).

(c) A link between the two types is found in a third group, which begins after the first or second year of life, and in a fourth group which shows symptoms at about the time of the second dentition (7th year of life). The third group has been described by Pelizaeous who found the optic nerve atrophy developing in children about three years old. No macular changes ever appeared. The children lived longer than usual, and in some cases even attained adult life. The clinical manifestation consisted in a progressive spastic cerebral paralysis, diplegic in distribution. Greenfield found an atrophy of the retina, beginning in the macular region in one of the juvenile cases.

The treatment of amaurotic family idiocy is essentially symptomatic and has practically no bearing upon the progress of the case. General hygienic measures are indicated and calcium bromid has been found to be of some slight use. Parathyroid extract should be given a trial in early cases. Any therapy aimed at the ocular condition is entirely without avail.

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SOLUTIONS FOR COOLING QUARTZ LIGHT.

LAWRENCE T. POST, M.D., F.A.C.S.

ST. LOUIS, MO.

The concentration of ultraviolet rays by a quartz lens system is attended with concentration of heat. The space of one inch is filled with distilled water, or solutions of copper or ferrous sulphate, keeps down the temperature to an increase of 1.5 degrees or less, during the time necessary for a therapeutic exposure.

With uviol light therapy becoming each day more important in ophthalmology, many problems as to apparatus and procedure demand attention. Among these is the question as to what solution is best adapted for cooling the rays emitted from the carbon arc, and focused by the quartz lens system of the instruments made for ultraviolet light therapy. The heat generated by the carbon arc, after passing thru the condensing lenses, is so intense that some device for cooling is necessary. A chamber with inside dimensions between the two quartz glass ends of about one inch, is supplied with the instruments manufactured for the ultraviolet radiation of the eye. Some solution must be used which will not only absorb the heat rays but will not affect the ultraviolet rays. The solutions recommended are ferrous sulphate and copper sulphate. The former has the disadvantage of being unstable and forming quickly a cloudy precipitate.

Experiments were made to determine the efficacy of each of the three following solutions as regards their cooling properties: copper sulphate in 2.5% solution, for each inch of fluid between the ends of the container; ferrous sulphate in 5% solution, and distilled water.

Two thermometers were set up two inches apart, one with blackened bulb being in the focus of the rays from the apparatus, to measure the elevation of the temperature at this point, and the other entirely outside of the rays to measure the increase of temperature of the room. The difference in these two readings was considered to be the increase due to the ultraviolet beam from the instrument. The cause of the elevation in temperature outside of the rays was the heat from the arc lamp and from the rheostat which was placed about four feet from the thermometers. This becomes red hot and is quite a noticeable addition to the heat of a small room. The rays were allowed to act for ten minutes in each test. This length of time was chosen as being practically the maximum of time advocated for one treatment. Temperature readings were made after each minute.

The most important result of the experiments was the finding that all three solutions were exceedingly efficacious. The maximum increase of heat at the focus of the rays, over the increase of room temperature was 1.5 degrees, which is an insignficant amount, and the minimum was .3 degrees, a difference of only 1.2 degrees between the extremes. It might be added, that without the water chamber and uviol glass the heat at the focus of the rays from the instrument with which these experiments were made was sufficient to ignite paper.

The difference in the cooling value of the three solutions was found to be less than one degree. All permit the passage of ultraviolet rays. The copper sulphate has the slight disadvantage of leaving a precipitate of the copper salts and the necessity of keeping a stock of the proper percentage solution on hand. Ferrous sulphate is the least desirable for it quickly becomes cloudy. Distilled water is very accessible and tho less efficacious as a cooler it is quite effective enough.

An interesting feature of the temperature curve is the sudden elevation at the start, amounting to about two-thirds of the total in the first two minutes. This is followed by a slow rise to the maximum temperature which is reached after about six minutes.

Thereafter the reading remains practically constant.

Three experiments were made with each solution, but for economy of space only one typical example of each of the three is given.

1. Distilled water in water chamber.

Temperature at focus	Minutes elapsed	Temperature not in beam
79. °	0	78.6°
80.2°	1	
80.8°	2	
81.5°	3	
81.8°	4	79.6°
81.8°	5	
81.6°	6	
81.8°	7	
81.8°	8	
81.8°	9	
81.9°	10	80. °

Maximum temperature increase at focus of ultraviolet light = 2.9°.

Maximum temperature difference in room, outside of beam = 1.4°.

Elevation due to light = 1.5°.

2. 2.5% copper sulphate in water chamber.

Temperature at focus	Minutes elapsed	Temperature not in beam
77.4°	0	77.5°
77.7°	1	
77.8°	2	
78. °	3	
78.1°	4	
78.2	5	77.7°
78.2°	6	
78.2°	7	
78.2°	8	
78.2°	9	
78.3	10	77.9°

Maximum temperature increase at focus of uviol light = .9°.

Maximum temperature difference in room, outside of beam = .4°.

Elevation of temperature due to light = .5°.

3. 5% ferrous sulphate in water chamber.

Temperature at focus	Minutes elapsed	Temperature not in beam
76.6°	0	76.8°
76.8°	1	
77.2°	2	
77.3°	3	
77.5°	4	
77.6°	5	77.2°
77.6°	6	
77.6°	7	
77.7°	8	
77.7°	9	
77.7°	10	77.2°

Maximum temperature increase at focus of ultraviolet light = 1.1°.

Maximum temperature difference in room, outside of beam = .4°.

Elevation due to light = .7°.

The average elevation when distilled water filled the cooling chamber was 1.3°; with copper sulphate it was .5° and with ferrous sulphate it was .56°.

520 Metropolitan Bldg.

HISTORIC EVOLUTION AND USE OF SPECTACLES.

EDWARD JACKSON, M.D.

DENVER, COLORADO.

Engraved gems from antiquity show the makers needed magnifying lenses, and must have known their use. When reading, writing and fine mechanical work became common, the help of such lenses was more widely understood and spectacles came into use. Knowledge of the optics of the eye, myopia, hyperopia, astigmatism and their effects, increased the use of spectacles. To avoid aberrations meniscus lenses have come into general use, and the mechanical perfecting of spectacles follows the understanding of eyestrain and its bad effects on health.

The cutting and polishing of precious stones was widely and highly developed in the oldest known civilizations. The seals of Babylon, the scarab amulets of Egypt, the breastplate of the Hebrew High Priest, the gems of Greece, the signet rings of Rome furnish the finest, most important and numerous of the relics, that tell the story of the art and history of antiquity. Close examination of the lines cut by the gem engravers of Babylon and Egypt, in stone so hard that they seem perfectly preserved after 6,000 years, suggests that they could not have been traced by unaided human vision. The artist who made them possessed some means of magnifying his work.

The older gems were generally finished with smooth curved surfaces. In the old Hebrew breastplates the twelve gems were all finished in this way. The finishing in facets, set at angles mathematically exact, as we see them in the different forms of cut diamonds, was probably not practiced until after the introduction of the grinding wheel in Greece, about 500 B. C. So it happened that many of the transparent gems of ancient Greece and Rome had the smooth rounded surfaces, that gave a lens refraction of light passing thru them. Pliny says that Nero was near sighted, but the possession of an emerald, thru which he watched the combats of the gladiators, was probably not peculiar to the Roman Emperor. It was exceptional that, because he was Emperor, his defects got mentioned in history.

In 1847 Sir Austin Layard found in the ruins of Nineveh a convex lens of about ten inches focal length made from rock crystal. From all we know of ancient Babylonia and Nineveh, it is probable that such a lens was made 5,000 years ago, by a gem cutter, to help him in doing finer work than was possible without it. The help it gave would make it well worth having; and the use and production of such lenses probably extended to Greece with the art of gem cutting. Aristophanes, 424 B. C., had mentioned the use of a "burning glass"; and in Rome, in the first century A. D., Seneca, the teacher of Nero, stated that magnifying lenses were used by engravers, and Pliny described them as polished spheres of glass, or hollow spheres filled with water.

With the division and decline of the Roman Empire came the rise of the nations of western Europe. While the gem shaping and engraving of Rome lost much of its fineness, the art was carried to Spain, France, Belgium, England and Holland. Meanwhile another vocation requiring good sight and magnified images arose in the reproduction and illumination of manuscripts. It seems certain that a knowledge of the value and the methods of making magnifying lenses became diffused in Western Europe chiefly among philosophers, mathematicians and astronomers, in the monasteries and growing universities. The optical writings of Ptolemy and Alhazen were translated, and became the basis of the first optical treatise of Europe, written about 1270 by Vitellio of Poland.

It is certain that Roger Bacon of Oxford (1214 to 1294) studied Vitellio and had convex lenses, that he probably ground himself. With these he devised a telescope and a microscope, and studied the great nebula of Andromeda, and the forms of minute

plants and animals and tissue details. These he reproduced in his manuscript, written in cipher and left to a friend to escape the censorship of his ecclesiastical superiors, and recently discovered by Voynich and partly translated by Newbold. Bacon escaped punishment for witchcraft, and the world was held 600 years under the reign of superstition and disease. But 300 years after Bacon's death when Galileo made telescopes that magnified 32 diameters, and presumed to show the sun spots to "eminent persons" of Rome, he was summoned before the inquisition; and in his seven years of retirement he had time to reflect on the dangers of trying to know things, of which the authorities of the church were content to remain in ignorance.

It seems certain that about the close of the 13th Century, among the gem cutters, students and copyists of Western Europe, were some who knew of the value of convex lenses as magnifiers; and as they grew older felt the increasing need for them to correct the presbyopia which, without lenses, would have terminated their labors. It is probable, almost to certainty, that among these users of fine vision, some would devise means of keeping the lenses before the eyes, without having to devote their hands to this use; and that the more serviceable of the means used for this purpose would be imitated by others. When Alexander de Spina of Pisa was said to have seen a pair of spectacles worn by some one who made a secret of their invention, such secrecy might well have been based on a desire to avoid the dangers of charges of witchcraft. Salvinius Armatus of Florence could only safely make claim of such an invention by having it placed on his epitaph.

At that time, twenty years after the death of Roger Bacon, when some of his writings with regard to optics were known in the monasteries, he might very well have been credited with inventing spectacles, which were beginning to be rather widely known and used, among that very small part of the people who could read, or who habitually used their sight in a way that would be greatly helped by spectacles. The return of Marco Polo from China to Italy, about 1295, and the history of his adventures, may well have started the tradition that spectacles were invented in China and the knowledge of them brought thence to Europe. But what is known, of the crude and late development of Chinese carving and art, makes such an origin for spectacles quite improbable.

What we know is, that lenses were made and used to assist human vision for thousands of years before the close of the 13th Century; that the number of readers, penmen, artists and gem cutters, to whom they would be most useful, had recently greatly increased in Western Europe. It is almost certain that some of these who were thus using lenses, probably several of them about the same time, would work out the means of supporting them before the face. The uncertainty and conflicting claims, as to who invented them, are fully explained by the number of people who needed them and were thinking about such helps.

The history of invention is full of multiple claims of inventors, who at about the same time worked out independently, but often similar, devices to meet a need that they felt for themselves and believed would be felt by others. Discoveries and inventions often have the name of a single man attached to them, when his share in them has been relatively small, and their origin has been mainly in the common knowledge, experience and desires of his race. The important fact is, that spectacles came to be used and known in Europe near the close of the 13th Century, not the name of the man who happened to be making them, or promoting their use.

All thru the history of lenses two elements are to be recognized in their production and improvement—scientific knowledge of the needs they could meet and the laws of their action, and practical acquaintance with the materials of which they could be made and skill in shaping them. At first both elements were supplied in the same individual, the cutter of gems from

precious stones that were more or less transparent; and this combination continued to a considerable extent down to a very recent date. We are told that Galileo made hundreds of his telescopes with his own hands, that were sent to all parts of Europe.

Leeuwenhoek, of Delft, Holland, early devoted himself to the manufacture of microscopes, but "it is clear from the discoveries he made with these that they must have been of excellent quality." His discoveries were published mostly in the Philosophical Transactions of the Royal Society of London, and he was a corresponding member of the Paris Academy of Sciences. He was the predecessor of Pasteur in his opposition to the belief in spontaneous generation, and made some of the first observations to support the dictum of William Harvey "Omne vivum ex ovo." His contemporary, Robert Hooke, who called attention to the 1 minute "minimum seperabile" angle, and made important contributions to theoretic optics, owed his advancement and position as Curator of the Royal Society, largely to his mechanical skill.

Sir Isaac Newton "having thought on a tender way of polishing proper for metal," made a reflecting telescope, with which he saw the moons of Jupiter and the phases of Venus. Sir F. William Herschel, when unable to buy a suitable reflector for his telescope, learned to grind and polish the mirror he needed; and in 1774 produced the telescope with which he started his survey of the heavens. Only this summer, one of the mirrors which Herschel had made 150 years ago with his own hands, was brought out and used for the first time, in the observation of the total eclipse of the sun visible in Northern Europe. It was the astronomer Kepler (1571-1630), with his sight damaged by small-pox when four years old, but aided by one of the telescopes made by Galileo, who founded the new astronomy and who first worked out the focusing of light in the eye. That possessor of a most practical mind, Benjamin Franklin, when subjected to the difficulties of presbyopia, devised practical bifocal lenses, and by his use and report of them secured their trial by many who had to face the same difficulties.

In 1801, Thomas Young, physician, physicist and philosopher, detected and measured the astigmatism in his own eye. But in 1827 G. B. Airy, at the age of 26, who had recently been appointed Lucasian Professor of Mathematics at Cambridge, published the account of his own astigmatism which then amounted to almost 5 D. The nature of the defect he had worked out, and had made a correcting glass by the opticion Fuller of Ipswich. This correction of his ocular defect enabled him to carry on for more than 50 years, those enormous mathematical calculations and observations that made him the Astronomer Royal in 1835 and later gained him Knighthood, and placed astronomy in Great Britain in advance of its development in other countries. In 1849, when he was thirty, G. E. Stokes was appointed Lucasian Professor of Mathematics at Cambridge, 180 years after Sir Isaac Newton, and 23 years after Sir George Airy had received the same appointment. That year, he added to the history of astigmatism a description of the Stokes' lens.

In 1826 a clergyman in Western New York, by the help of a concave lens, studied his own defective vision, concluded he had astigmatism and followed the example of Airy. He sought the help of an optician, McAllister, of Philadelphia, who ground for him a cylindrical lens that relieved him of his optical defect and handicap, and who later assisted Dr. Isaac Hays to give similar relief to two of his patients. The ophthalmometer described by Helmholtz in 1854, used in the laboratory by Arlt and Knapp, and adapted to clinical use by Javal and Schiötz, in 1881, gave exactness and breadth to our understanding of astigmatism. Donders and his pupils showed its common occurrence, clinical effects and practical importance. The publication of his "Accommodation and Refraction of the Eye" in 1864

established astigmatism and hyperopia as indications for the use of lenses equal in importance to presbyopia and myopia.

In 1810 Wollaston called attention to the advantages of meniscus or "periscopic" lenses, and worked out a series of forms for them, that reduced to a minimum the astigmatism due to looking obliquely thru a correcting lens. Ostwalt suggested a series of such lenses in which much the same result was reached, with surfaces less highly curved. Tscherning graphically represented the relations of the desirable meniscus lenses, by the ellipse known as the Tscherning curve. Various students of optics, working with manufacturers of lenses in Germany, have suggested these highly curved or "coflexed" meniscus lenses. Von Rohr, working for the Carl Zeiss works, has planned the socalled "punktal," or "pointfocal," and the "katral" lenses that are brought to the notice of physicians and opticians by the teachings and writings of Henker. Apparently the Zeiss forms have been adopted in this country, while another student of optics, Tillyer, has suggested similar curves that are used by the American Optical Company.

In the United States socalled "toric" lenses belonging to this general class of practical meniscus lenses, have had an extended use for about 30 years. A general understanding of the underlying principles involved, and readiness to prescribe, test and supervise the use of such spectacles, is worthy of wide and careful attention from all who prescribe, make or fit lenses. The use of particular brands of meniscus lenses, under patented or copyrighted names, without an understanding of their scientific significance, is likely to lead to confusion and uncertainty, that offer great opportunities for optical quackery.

Along with the growing use of meniscus lenses has come wider resort to prismatic combinations, or effects from decentered lenses. This movement also belongs to the development now going on, rather than to the history of lenses. The multiplication of different kinds of glass and of mountings and frames for lenses, has also gone forward, under the proprietary interests and rights of manufacturers, and even the influence of fashion, at a truly confusing speed. The multiplicity of forms of frames suggested is well brought out by the article by Emory Hill in volume VII of the American Encyclopedia of Ophthalmology, p. 4894.

To sum up this view of the historic development of spectacles: They took their origin in the incidental observations and needs of a small number of workers in minute figures, fine lines and minute ornamentation. Their use extended after the introduction of reading and writing, and particularly the invention of printing, the increase of occupations requiring minutely accurate vision and their pursuit beyond the age of presbyopia, that came with the lengthening of human life. A new field was opened for them by the discovery that optical defects and strain of the eyes caused discomfort, disability and serious impairment of health; so that now the correction of optical imperfections and deficiencies of the eye has become an important contribution to the physical basis of our civilization. Only a historic review of the optical progress of the past, a comparison of the mode of life and requirements of the past, can give a good conception of the importance of optical assistance in the general life of our race and civilization.

NOTES, CASES, INSTRUMENTS

THE FIRST ENCYCLOPEDIA OF OPHTHALMOLOGY.

JAMES MOORES BALL, M.D.,

ST. LOUIS.

Read before the Ophthalmic Section of the St. Louis Medical Society, April 8, 1927.

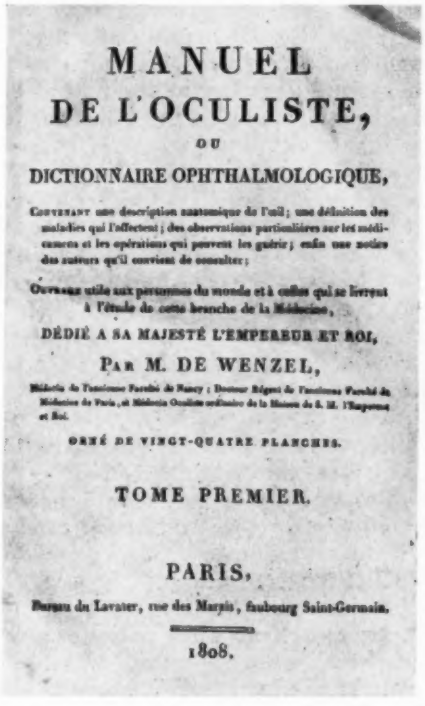
The growth of ophthalmic literature has become one of the marvels of recent years. Especially is this true of journal articles. In the past quarter-century comparatively few ophthalmic text-books have been issued in the English language. On the other hand, those few which have passed successfully thru the crucible of criticism have given their authors the satisfaction, as well as the labor and the worry, of repeated editions.

Owing to the economic exigencies caused by the Great War, in both the United Kingdom and in the United States, consolidation of old, well-known and honorably conducted ophthalmic periodical publications became imperative. While, in a sense, this is a matter for regret; yet, on the other hand, the result of such fusions has been creditable to all parties concerned.

The present day is a time of encyclopedias, not only in general literature but also in ophthalmology. Works of the latter class are not new. They date from the year 1808, when de Wenzel issued, in Paris, his two-volume "Manuel de l'Oculiste, dédié a sa Majesté l'Empereur et Roi," with the contents arranged alphabetically.

This life is a queer admixture of contradictions. The first encyclopedia of ophthalmology was dedicated to Napoleon. Of the many strong characters whose biographies adorn the bloody pages of history—for, the greater part of human history is made up of wars and of rumors of wars—there was not one whose life was more of a riddle, or was more tempestuous, than was that of Buonaparte.

This man who was not a Frenchman,* but was a Corsican, for years held a large part of Europe in the hollow of his hand; and to aid his ambitious schemes, more than four millions of Frenchmen laid down their lives. This man, who could direct the murder of the Duc de Bourbon and who, by treachery, captured Toussaint L'Overture and tortured his victim; this man, who alternately exhibited the noble traits of a great mind and



MANUEL
DE L'OCULISTE,
OU
DICTIONNAIRE OPHTHALMOLOGIQUE,

Contenant une description anatomique de l'œil; une définition des maladies qui l'affectent; des observations particulières sur les médicamens et les opérations qui peuvent les guérir; enfin une notice des auteurs qu'il convient de consulter;

Ouvrage utile aux personnes du monde et à celles qui se livrent à l'étude de cette branche de la Médecine,

DÉDIÉ A SA MAJESTÉ L'EMPEREUR ET ROI,

PAR M. DE WENZEL,

Médecin de l'ancienne Faculté de Nancy; Docteur Régent de l'ancienne Faculté de Médecine de Paris, et Médecin Oculiste ordinaire de la Maison de S. M. l'Empereur et Roi.

ORNÉ DE VINGT-QUATRE PLANCHES.

TOME PREMIER.

PARIS,

Barrois du Lavater, rue des Marais, faubourg Saint-Germain.

1808.

the littleness of a despicable person, was, strange to say, the patron of artists and of scientists. He could not think of invading Egypt without carrying with him a coterie of distinguished scientists!

M. de Wenzel's "Manuel de l'Oculiste" is in two demi-octavo volumes, comprising 523 and 288 pages of text, respectively; and is illustrated with 24

*Napoleon was born at Aiaccio, in Corsica, on the 5th of February, 1768. He afterwards gave out that he was born on 15th August, 1769, being his saint's day. In the interval between Feb., 1768, and Aug., 1769, Corsica was annexed to France, so that he could not have been a French citizen by nativity, without thus stating his birth.

plates showing 68 figures which have been cut in copper. The pictures concern a few operative procedures and many instruments. The accompanying plate reproduces the title-page of Vol. I., Paris, 1808.

HIGH MYOPIA IN A CHILD.

L. L. McCoy, M.D.

SEATTLE, WASHINGTON.

Edgar S., age two years, eight months, white, apparently healthy, was seen Dec. 31, 1925. His mother, who is very intelligent, said she had noticed that the baby was in the habit of holding his toys extremely close to his eyes while at play. He had a number of styes in the four or five months before examination. Otherwise he was very well and always had been except for mild attacks of some of the children's diseases. He was born by Caesarian section, as was his brother, who is six years of age and very well. The family history is irrelevant except for one or two slightly near sighted people on the mother's side, two or three generations previously. His mother and father have both been refracted within the past two years and both are moderately hyperopic with very little astigmatism.

Routine examination showed nothing except that the patient always brought objects to within two to four inches of his eyes, when given them to look at. He was given atropin salve 1% to be used in his eyes each night for four nights, and then he was to be brought in again for refraction.

The patient was a very good little fellow and allowed a very careful retinoscopy which showed:

R. —15.50 with —4. cyl. ax. 180°.

L. —15.00 with —5. cyl. ax. 180°.

The ophthalmoscopic examination with a —15.00 lens showed the globes to be in good condition. —16.50S. with —4. cy. ax. 180°, right and left, were ordered. A recent letter from his mother states that he enjoys his glasses very much and tells her frequently that he can see now. A big difference in his attitude has resulted.

I have been unable to find a case recorded in the literature of so high myopia in a child so young. A similar case, but less marked, in a Chinese boy eight years of age, was seen recently. His refraction under atropin indicated, and he was given:

R. —13.50S with —4.00 C. ax. 15°.

L. —12.50S with —4.00 C. ax. 165°.

The eyes otherwise were very normal. He was in today (July 22, 1926) and his glasses seemed very satisfactory.

It is not unusual to find moderate myopia in children of the Oriental races, and no doubt heredity plays a part, as myopia of moderate to high degree is quite prevalent in adults of Oriental origin, especially the women. This more or less racial characteristic has undoubtedly developed thru long years of very close visual application in the production of fine embroideries, carved ivory and other things of minute detail work. It is difficult to explain the very high myopia in the little boy above, as there seems to be very little, if any, familial tendency to nearsightedness, and since the child has never been to school or had any reason to use his eyes for close application, it cannot be explained from that standpoint. One might say that the condition is a congenital deformity as is club-feet, torticolis, or any other malformation.

I have been able to discover only very slight, if any, myopic changes in the fundus, such as myopic choroiditis, myopic conus about disc, etc., in myopic children; but nearly always one or more myopic changes are to be seen in myopic adults. Usually the fundal changes are in direct proportion to the refractive condition. This is probably due to a difference in the texture of the tissues; the older the individual, the less elastic the tissues, hence the more easily the tissues are thinned and separated by stretching.

Children with high myopia must be kept under close observation and their glasses kept checked up very carefully, also their daily reading habits and general health must be closely guarded, because of the great probability of

the myopic condition becoming of a rapidly progressive or malignant type, in which case, he may have to give up all kinds of close work and depend upon sight conservation schools for his education. Even then his condition may become so extreme that lens extraction becomes necessary, to insure vision enough to get about. Such extreme cases should be carefully refracted, under atropin mydriasis, at least once a year, to determine the state of the condition and what procedure is necessary.

817 Summit Ave.

A NEW REFRACTION INSTRUMENT.

JOHN FASSETT EDWARDS, M.D.

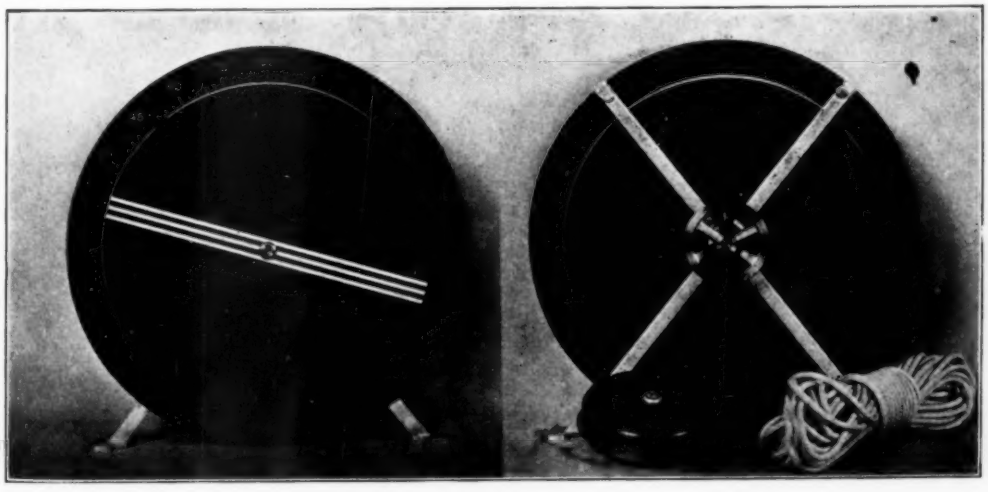
HOLLYWOOD, CALIFORNIA.

For many years the writer was harassed by the inadequacy of the usual refraction methods, with particular reference to astigmatism. The retinoscope helped somewhat, but being solely an objective test left much to be desired. The ordinary astigmatic chart is nearly useless. Under the whip of necessity, many models were made and designs drawn until three years ago, when the present device was originated. Since that time the instrument has been very carefully tested in office work, and the writer now feels justified in presenting his invention to his fellow refractionists.

Purely spherical ametropia is usually easy to refract, but nearly every case will show some astigmatism if properly handled. This device will very quickly and easily diagnose the presence or absence of astigmatism, and indicate the axis of the correcting cylinder. Used during the refraction it will indicate the definite completion and correctness of the astigmatic fitting.

It is a purely subjective test, dealing simultaneously with all types of astigmatism, as the patient sees. It will show astigmatism in delicate degree, is a great time saver (three minutes will suffice to diagnose astigmatism and give the axis of the correcting cylinder, in an average case), and will save much changing of lenses, and worriment as to the exactitude of the most difficult and laborious part of refraction, the correction of astigmatism.

The instrument consists of a disc of black bakelite across which are three centrally placed sharply defined white lines, whose width is that of standard test chart letters of 20/40 vision. The disc is surrounded by a fixed rim of like material, bearing graduations in degrees comprising a half circle, the whole supported by a stand of cast



Front. Back.

Fig. 1. Instrument to determine astigmatism. Front shows lines and degrees for axis. Back, with connecting cord and rotor.

aluminum finished in black enamel. The apparatus is to be attached firmly by its feet to a narrow shelf, at proper height. The disc is rotated by distant control from a position at the patient's seat. An endless braided cord over a mahogany rotor furnishes the driving mechanism.

It is the writer's practice to start the refraction by having the patient, properly seated, inform the oculist, who meanwhile slowly revolves the disc of the apparatus, at what particular axis the white cross lines are seen most clearly. This being definitely located, the cross lines are set at 90° therefrom, which will be found to be the axis of greatest blurring of sight (except in cases of the rather uncommon irregular astigmatism due to corneal scars or lenticular changes). If the cross lines seem to the patient to be equally clear at all axes there is no astigmatism to be corrected.

Each eye is worked upon separately in this fashion. This test may be used with or without a cycloplegic, the latter, of course, being preferable.

After the usual dark room work shall have been concluded, vision on reading chart taken, muscles studied and the various ocular adnexa considered, the patient is ready for the final and all important part of the refraction, the trial case work.

The first and diagnostic test is repeated, locating accurately the axis of greatest blurring, as shown by this device, allowing the disc to remain at the axis of greatest blurring as now found, and the sight is bettered by the use of trial cylinders, set at the axis of the cross bars on the machine. The use of cross cylinders will be found very valuable at this juncture.

The vision having been brought to clarity on the cross lines the disc is slowly revolved. If the correction be accurate the patient will see the cross lines equally well at all axes, and the astigmatic error is fully and completely corrected. Tests may now be made with spherical lenses, using the test chart letters.

This device will show degrees of astigmatic error finer than we have test lenses to correct the ocular error.

It is the practice of the writer to shift attention of the patient from the astigmometer at frequent intervals to a reading chart located just beneath the mechanical device. This keeps one constantly posted as to the progress of the visual correction.

It is astonishing how quickly one may refract a case with this device, particularly with the test chart in sight at all times that quick reference may be made to it for readings. Also how accurately the finding may be made, because of the constant chance to check up one's advance at all times by the device under discussion.

With this machine refraction has ceased to be a bore, and is rendered accurately simple and easy. The apparatus is quite as effective with small children as with intelligent adults. In my hands it has almost entirely supplanted routine retinoscopy, as I find it far more satisfactory and very much quicker.

1680 North Vine St.

SOCIETY PROCEEDINGS

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY.

February 15, 1927.

E. K. Ellis, M.D., President.

Three Cases of Sympathetic Ophthalmia.

Dr. F. H. Verhoeff tried injecting into the muscles blood taken from the patient, and up to the time of the meeting the eyes had whitened and the condition seemed to be controlled. At the time of the meeting the eyes were again slightly inflamed and the patients were advised to return to the hospital for further treatment.

Discussion. Dr. George S. Derby stated that some fifteen years ago he had treated a case of sympathetic ophthalmia with blood serum taken from a man who had shortly before recovered

from that disease. The result of this one case was extremely good.

Anterior Annular Staphyloma.

DR. S. H. WILKINS presented a case of anterior annular staphyloma where the patient had intermittent yearly attacks of inflammation in each eye for ten years but has been free from attacks during the last ten years. The early personal history was unimportant. Vision in the right eye was 3/200 and vision in the left eye was 20/70, unimproved by glasses.

Wassermann was negative. Tension in right eye was 35 and in the left eye 18 (Schiötz). There was a marked thinning and bulging of the sclera at the sclerocorneal margin extending to the equator. The iris was atrophied with a noticeable iridodonesis in the right eye. The iris was bound down by adhesions in both eyes.

Dr. Wilkins felt that an iridectomy was the only thing to do in this case.

Discussion. DR. GEORGE S. DERBY said that he had found that ordinarily when a pupil became badly tied down, an iridectomy should be done early.

Specific Optic Atrophy.

DR. S. J. MCDONALD presented the case of a factory employee, 37 years old, who had trouble distinguishing colors. The vision in the right eye was 20/50 and the vision in the left eye was 20/70, unimproved. The disc in each eye showed some pallor. There was a history of iritis in each eye three years ago of three months duration.

At the present time, the eyes are white and quiet, the pupils react to light and the media are clear. The fields in each eye show large central scotomata. The fields suggested alcoholic amblyopia, which might be possible as the patient works in a mill near a vat containing alcohol.

The sinuses and teeth were negative but there was a chronic inflammation of the tonsils. Altho lues was considered, it is interesting to note that the neurologic examination showed absent abdominals and a few paresthesias in the past, suggesting multiple sclerosis, but a strongly positive Wassermann made the diagnosis definite.

The patient was discharged from the hospital unimproved.

Glaucoma with Retinal Separation.

DR. GEORGE S. DERBY reported the case of a doctor 69 years of age, who was first seen in 1916 with a chronic simple glaucoma of each eye. He had a moderate mixed astigmatism. The field in the left eye was markedly contracted. As pilocarpin would not hold down the tension in this eye satisfactorily, operation was proposed and refused. The eye became blind and developed congestive symptoms and in 1925 was removed. Meanwhile the right eye showed a slow but steady contraction of the nasal field which, however, did not reach the fixation point. The pressure in this eye had varied between 13 and 22 mm. (Schiötz) over a period of ten years. The tension was usually below 20.

Nov. 2, 1926, he awoke one morning to notice almost entire loss of vision in the right eye; the vision with glass was 1/200. The ophthalmoscopic examination showed a marked glaucomatous cupping and a large separation of the retina reaching to the macular region. The lower temporal quadrant of the field of vision was maintained. The pressure was 17 mm. of mercury. The separation transilluminated well. An attempt was made to increase the tension of the eye by use of homatropin but this was unsuccessful. At present the vision of this eye equals 8/200 and the separation stays about the same. An idiopathic separation of the retina in a glaucomatous eye must be an uncommon happening.

Discussion. DR. F. H. VERHOEFF and DR. W. HOLBROOK LOWELL stated that altho cases of separation of the retina in glaucoma were unusual, still it seemed not surprising that it could occur in a case with low tension.

Dial Chart for Paralysis of Extraocular Muscles.

DR. S. H. WILKINS showed a very clever chart which consisted of two pieces of cardboard held together at each end with pins which pierce revolving discs. The discs have printed

on them the names of the muscles and other data, which appear thru cuts in the cards according to the way in which, by given directions, the discs are rotated.

This chart is simply an elaboration of Dr. Duane's table, helping in an added way by visualizing the conditions present in ocular muscle paralysis. Not alone may it be of assistance in the determination of the affected muscle directly from the case, but also of use for teaching purposes and for personal review.

There are added to the chart several well known axioms such as "The paretic eye lags in the field of action of the paralyzed muscle. The false image is always projected in the line of action of the paralyzed muscle," etc.

W. HOLBROOK LOWELL,
Recorder.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

March 21, 1927.

ROBERT H. BUCK, President.

Cataract Extraction in High Myopia.

DR. BEULAH CUSHMAN presented a patient on whose left eye she had performed an intracapsular extraction following an iridectomy two weeks previously. Myopia of 16 diopters was present before operation. Before the lens became completely cloudy no fluidity of the vitreous was noted. A slight amount of vitreous was lost at operation. Final result was 20/27 vision with — 1.50 C. ax. 120°. There was a detachment of the retina with complicated cataract in the other eye.

Intracapsular Cataract Extraction.

DR. GAIL R. SOPER presented a case of old syphilitic iritis with complete annular synechiae, deposits on Descemet's membrane, secondary glaucoma and cataracta accreta. Vision was limited to light perception and projection. A preliminary iridectomy had been done under Dr. Suker's supervision two weeks previously, and ten days ago an intracapsular extraction was done. Vision had increased to counting fingers with some difficulty at ten inches. Postoperative reaction had been negligible. Attached to the anterior lens capsule was a large ring of iritic adhesions.

Cisterna Magna Injection for Tabetic Optic Atrophy.

DR. N. K. LAZAR presented the case of a patient with vision in the right eye 20/200; left eye, only hand movements. Previous to this she had had six months antiluetic treatment. The fields were contracted, there was loss of color vision in the left eye; contraction for all colors, especially red and green in the right eye. On February 26, a cisterna magna puncture was done and 1/33 gr. mercuric chlorid injected. A few days later vision in the right eye was 20/200; left eye 8/200. On March 18, another cisterna magna puncture was done, vision improving to 10/200 in the left eye, while the right remained 20/200. Fields showed marked contraction. When first seen the patient could not distinguish anything except shadows, with the left eye, but now she can recognize objects. So far there had been no marked change in the form field in the right eye and no color perception in the left.

Lagophthalmos with Plastic Correction.

DR. KECKICH presented this patient who entered hospital with left facial palsy, left lagophthalmos, ectropion of the lower lid and keratitis with lagophthalmos. The palpebral fissure was of such width that even when the patient attempted to close the eye the whole cornea was exposed. A vertical flap was taken from the left temporal region and brought into a defect made in the upper lid and sutured in place. This was done by making an incision in the upper lid above the upper margin of the tarsus and parallel to the free margin of the lid, thru the skin, orbicularis and levator muscles to the palpebral conjunctiva, and was undermined above and below. The pedicled vertical flap was then carried horizontally into the defect. This procedure corrected the lagophthalmos.

The ectropion was corrected by making a tongue like flap in the lower

lid near the outer canthus and carrying this up and out under a bridge of skin, where it was sutured. This operation is not unlike the Hunt-Tansley operation for ptosis, and it corrected 50 percent of the ectropion. Now a similar operation was proposed on the nasal side of the lower lid to correct the remaining ectropion. The patient could now close the eye to the extent that all the cornea was under cover. The keratitis had subsided. The vision had improved from fingers at a few feet to 20/200.

Cisterna Magna Injection for Tabetic Optic Atrophy.

Dr. J. Lifschutz showed a man, 62 years old, who had a history of blindness in the left eye for over a year, and had had failing vision in the right eye for about six months. He had a primary luetic infection thirty years ago. A thoro examination by the medical and neurologic departments corroborated the diagnosis of tabes, with Argyll Robertson pupil and a 4 plus spinal fluid. Vision in the left eye was nil; in the right, 8/200. Both discs showed a grey temporal pallor, more marked in the left eye. Right field showed a peculiar hemianopsia, probably due to luetic basilar meningitis. At Dr. Suker's suggestion, an injection of 1/22 gr. bichlorid of mercury was given on February 2, thru a cisternal puncture; on the 19th, vision in the right eye was 20/200. On February 23, another injection of the same amount brought the vision up to 20/100. A third injection on March 16, the same amount given in the same way, gave a vision of 20/70 + 1. Examination of the fluid obtained thru the cisternal puncture gave 4 plus in the first two tests and 2 plus in the third test, all tests showing typical Lange Curve.

Tabetic optic atrophy is spirochetal in origin and inflammatory in character. Whether the process is neuritic, vascular or interstitial, the ensuing atrophy is gradual, progressive and most likely secondary in character. Hence it is probable that there is some stage of the disease at which by direct and proper treatment it may be checked. There are five forms of antiluetic treatment, namely, cutaneous, intramuscular, intravascular, intraspinal and intracranial. The intraspinal injection does not reach the ventricles of the brain, as has been repeatedly shown in dogs where examination of the brain following an injection of methylene blue into the spine did not show any stain of brain tissue. All other forms of treatment must reach the brain via the circulation, and this is apparently too slow or else insufficient in concentration to affect the disease. The intraventricular injection performed with proper technic is the most direct and probably the most efficient method of treatment. Its action is probably best in those cases where the process is still in its early and inflammatory stage and not where it has already proceeded to atrophy. While it may not serve as a cure, it may at least tend to check the progress of the disease. In view of the fact that all treatment so far for tabetic optic atrophy has been hopeless, and some results are obtained with this method, it should be tried more often.

Dislocated Lens.

Dr. Harry Woodruff showed a patient who had presented himself in January, 1927, with a downward dislocation of a cataractous lens in the right eye. The left eye was artificial, the globe having been removed ten years ago following operation for dislocated lens. In order to insure vision for this patient, it was necessary to select the most conservative procedure possible. Vision was about 20/200, with correction. An iridectomy was performed on January 17, the incision being made above with the keratome, the iris drawn out with the blunt hook and excised with the scissors held vertically to the wound. This made a very narrow coloboma. The operation was accomplished without any loss of vitreous. Vision now with correction is 20/30. The important point in this case was that useful vision was secured by iridectomy. An attempt to remove the lens would have been a great hazard on account of the certainty of loss of vitreous.

Iris Atrophy, Anterior Synechia, Ectropion Uveae and Cataract.

DR. C. O. SCHNEIDER presented a woman of 53 years of age, who came with a history that during childbirth twenty-one years ago the right eye was very painful and inflamed. Five weeks later an iridectomy was performed, probably for glaucoma, because the optic nerve now shows considerable cupping. The eye had since been comfortable, vision 20/200, and tension 22. Three years later she had a very painful inflammation and loss of sight in the other eye. This was treated, the sight improved, but six months later she had another severe attack of inflammation and pain and the sight in this eye was lost. Later a cataract developed. She now complained that this eye was painful. It was not inflamed. Tension was 24, cornea clear and there was no perception or projection.

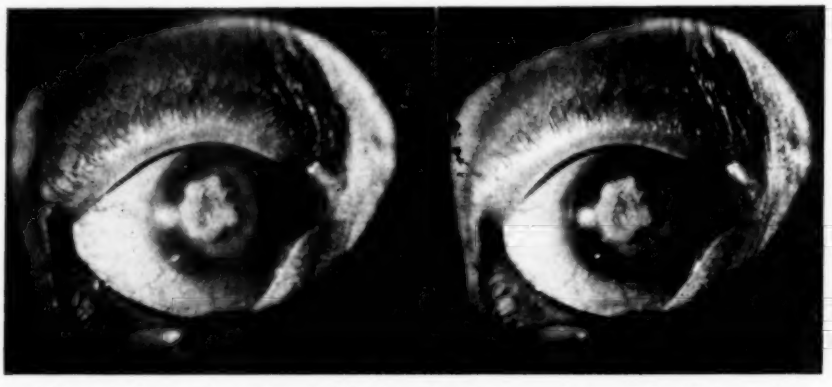


Fig. 1. Iris atrophy and projecting irregular chalky nucleus. (Schneider's case).

Examination revealed that the the nucleus of the lens was chalky, quite irregular in shape, and projected considerably anterior to the lens proper. The lens was greatly shrunken, grayish in color and tremulous. There was extensive atrophy of the iris, only a very small rim of it being left at the periphery and this being adherent to the cornea. The pigment extended over the edge of the iris, forming an anterior uveal ectropion. The very beautiful stereoscopic photograph of this eye was taken by Dr. Robert Von der Heydt. The present painful condition of this eye was, in Dr. Suker's opinion, due to calcareous changes, evidently in the sclera.

Discussion. DR. GEORGE F. SUKER commenting on the cases of intraventricular puncture that had been presented, showed a sagittal section of a brain to illustrate the location of the cisterna magna. The cisterna is located inferior to the cerebellum and superior to the medulla, about 1 cm. in height, 2 cm. in width and 2½ in depth. It is in fact the fifth ventricle of the brain. The injections are not so easy to give as one would think—not as easy as the ordinary spinal puncture. The slightest injury to the medulla or cerebellum will cause annoying complications. These, however, are most often transient. Usually an intense headache supervenes the injection, lasting for several hours. Very frequently there is vomiting or retching. The injections have given better results than any other form of medication in tabetic optic atrophy. For a classic case of tabes, where there is optic atrophy, little can be done. If, however, there are one or two symptoms of paresis or meningeal syphilis present, then medication does hold out quite a promise—at least checking the atrophy. Injections into the anterior horn of the lateral ventricle had been abandoned because this necessitates a trephine. The cisterna magna injection, in his opinion, was worth trying, and it is about the only treatment that offers these poor victims any real benefit.

DR. WM. A. FISHER asked to what

Dr. Cushman attributed the loss of vitreous in her case and whether she used a speculum. It would be interesting to know if Dr. Suker's case of adherent iris recovered without post operative complications, because it would be natural to expect complications in the healing process if a capsulotomy had been done. His own experience had been that adhesions that seem to be dense do not offer a serious hindrance in lens removal, and that normal pressure will usually remove the lens. The point he wished to emphasize was that if a lens is removed within its capsule, after complications are less than if a capsulotomy is done.

He congratulated Dr. Woodruff and his patient on the results obtained. Usually one selects the site of an iridectomy for optical purposes away from exactly upward, rather to one or the other side from 90 degrees in order not to have interference or obstruction of vision by the upper lid. Should the lens in this case require removal at some future time, it would be impossible, according to Barraquer, to operate by his method. Dislocated lenses are the only type of cases in which the Barraquer method is contraindicated.

Dr. Harry Gradle asked Dr. Lifschutz what anatomic proof he had that there are spirochetes in the optic tract, and what proof that the optic atrophy was due to this.

Dr. Beulah Cushman (replying to Dr. Fisher) said that there was a loss of vitreous. The operation was started with the speculum but the eye was hard to manage so she changed to Fisher's hook. The loss of vitreous was very slight and appeared normal in constitution. The man left the hospital in five days and was apparently making a rapid recovery with no evidence of any irritation or inflammation at any time. It is less than three weeks since the operation and the eye is entirely white; the only contingency to be faced now was possible detachment of the retina. According to different observers, eyes with a high myopia are prone to develop detachment of retina following operation.

Dr. Harry Woodruff (replying to Dr. Fisher) said that he had not thought of doing the iridectomy in any other situation than directly above. The object was to clear the lens, and the visual result left little to be desired. The man is now able to work at his trade, that of a painter. The etiology of the dislocation may have been traumatic or congenital. The history is not definite enough to determine.

Dr. Jacob Lifschutz (replying to Dr. Gradle) was not sure just where he had read the statement. He believed Stargardt said that tabetic optic atrophy is spirochetal in origin and inflammatory in character, in some German periodical.

Chloroma.

Dr. Richard Gamble said he first saw this girl in October, 1925, because of proptosis of both eyes, right 10 days, left 7 days. Moderate pain in eyes and head was present. She had been nervous and irritable for two years; dull and listless for about two weeks. She had had measles, mumps, chicken pox and a second degree burn of face, neck, right shoulder, left arm and hand. Family history was negative.

General physical examination showed eyes proptosed, limited in upward movement, the right in abduction also. There was resistance to replacement of the eyes. A tumor was felt in the upper outer quadrant of the right orbit, firmly attached to the bony rim. Right disc margins were blurred below where veins were tortuous and distended. Left disc was slightly blurred in inferior nasal quadrant. Vision was good. Tenderness existed over mastoids and frontals. There was injection of nasopharyngeal mucous membrane. Several enlarged lymph nodes were palpable under the ramus of the left jaw. There were some enlarged cervical and inguinal nodes. Otherwise the examination was practically normal. Blood count was: R. B. C. 2,800,000; Hem. 65%; W. B. C. 21,700; Polys 12%; small lymphs 72, large 13, Eosin. 1, Baso. 1. Diagnosis was chloroma.

In spite of treatment (roentgen ray) the condition progressed; paralysis of left facial and ulceration of both cor-

neae developed, and the patient died December 3.

Postmortem showed both orbits almost filled with green tumor tissue, extending backwards into the middle fossae and diffusely involving skull and both temporal bones. Dura was studded with small tumors. The sternum, lungs, spine, mesentery, kidneys, ovaries, thyroid and thymus showed tumor tissue.

Microscopic examination of the eyes showed a great increase in the thickness of the choroid, due to infiltration with W. B. C., chiefly myeloblasts, with a few small and large lymphocytes, poly, and an occasional eosinophile. The tumor in the orbits showed the same types of cells.

The author gives a general review of the subject of chloroma, with a bibliography since 1922 and several photographs illustrating his case.

Dr. George Suker said that the peculiarity of chloroma is the symmetry of involvement of the orbits. Chloroma, chlorosis and Hodgkin's disease are seemingly closely related. The color of the chloroma tumor varies from light green to deep olive green, and it will keep its color longer if put in a formaldehyd solution. What relationship there is between Hodgkin's disease and chloroma is unknown, but in all cases he had seen, there was an element of leucemia and involvement of the glands in the same manner. Hodgkin's disease comes in elderly people; chloroma is characteristic of prepuberty, not postpuberty, and chlorosis is an anemia appearing frequently at puberty and now seldom seen. The point he wished to emphasize was this: given a child of tender years, seven or less, with proptosis, beginning bilateral and symmetric orbital swellings, one should not always think of sinus trouble, as it might be chloroma. Proptosis as a result of sinus disease in children is rare. Chloroma apparently is more frequent in Hebrew children. Many chloromas are clinically classified as lymphadenomata, and the patient succumbs as result of lymphatic leucemia. The more intense the coloring of these tumors, the more rapid the dissemination and the earlier the exitus. Pathologically these chloroma masses are sarcomatous.

Dr. Richard Gamble said the case illustrates the importance of a differential blood count in a child with proptosis of both eyes.

It has been known for a long time from experiments and clinical observations that benzol has power to destroy bone marrow. That led to the idea of treating a case by benzol. The idea was logical, but the treatment was not satisfactory. Benzol does damage the bone marrow, but most cases are not diagnosed until the disease is far advanced, and this treatment probably does damage without doing any good.

Hyalin Thrombosis of Choroidal Vessels in a Case of Glaucoma.

Dr. Chester H. Lockwood read this paper. See p. 493.

Mechanism of Intraocular Pressure.

Dr. Michael Goldenburg presented a preliminary outline of the anatomic and physiologic factors concerned in regulating the intraocular pressure, dwelling especially upon the part played by the capillary blood vessels. The blood concerned in this cycle of phenomena is brought to the capillaries by the long and short posterior ciliary vessels. During the alternate dilatation and contraction of the capillaries the fluid elements of the bloodstream pass out thru the socalled intercellular spaces, by a process of osmosis thru the epithelium covering the ciliary processes and into the aqueous chamber. By the dilatation and contraction of the iris and ciliary muscle and the pressure of the external musculature, the aqueous is propelled thru the pupil into the anterior chamber. By this same process iris absorption is accelerated; and by the alternate positive and negative pressure exerted by the external musculature is aqueous escape into the canal of Schlemm brought about by osmosis, the meshwork of the drainage angle functioning as a permeable membrane. The nerve supply of greatest import to this mechanism is that of the motor system. The sympathetic system acting in a minor capacity as a refined regulator, functions within restricted limits.

. The perpetual cycle of phenomena is governed and regulated, according to the known and accepted teaching, by the laws of osmosis and hydrodynamics.

Discussion. Dr. Arno B. Luckhardt said that his interpretation of Dr. Goldenburg's paper was that it pertained to the formation of the aqueous humor and its transport out of the eye. The theme of the formation of the aqueous humor is a very old one, having its start with the fundamental observations of Karl Ludwig in the middle of the last century. These had already been outlined by Dr. Gamble and Dr. Lockwood. With respect to ligation of the vena vorticosae raising ocular tension, the source of fluid in the aqueous humor is presumably the posterior surface of the iris and the ciliary processes. He did not follow Dr. Goldenburg's theory of osmosis. In physiology this term was used of fluid passing from a point of lower to higher concentration, therefore, Dr. Goldenburg probably meant diffusion of material thru a permeable or semipermeable membrane.

A diffusible dye will pass into the canal of Schlemm and not into the lymphatics, and it is assumed that the aqueous humor leaves the eye by that route. There is one serious difficulty, however, with the assumption that the aqueous is a diffusate or transudate. It has been stated that when the iris becomes very adherent to the anterior surface of the lens, the aqueous humor in the anterior chamber of the eye disappears and the cornea wrinkles and the lens is pushed forward with its iris against the posterior surface of the cornea. These facts are supposed to indicate that the source of the aqueous humor is in the posterior surface of the iris or the ciliary process, or both. Is that actually the case? There are a number of things which will raise the intraocular pressure; certainly a sudden rise in the general blood pressure does so. As Dr. Lockwood said, it has been shown that obstruction of the vena vorticosae also increases the intraocular pressure.

In the light of Krogh's work, if one thought of changes in capillary permeability as a result of the action of certain chemical toxic substances, one could understand an elevated intraocular pressure and an increased formation of aqueous humor when toxic material accelerates transudation into the posterior chamber of the eye. If the aqueous humor were pure transudate it ought to conform in its physicochemical properties to the blood plasma, which it does not do. It is considerably more concentrated.

Mention was also made of the possible importance of the sympathetic nerve system in controlling intraocular pressure. Dr. Gradle had spoken of the action of adrenalin, which, in his experience diminishes the intraocular pressure. It is a vasoconstrictor drug and he wondered what effect it would have. Its action would be entirely local.

Krauss had described one of the muscles of the eye as the membrana orbitalis musculosa, consisting of smooth musculature twining around the ophthalmic vein and being under sympathetic control. When contracted, Krauss described it as the cause of intermittent exophthalmos. This muscle is, as said, under sympathetic control and stimulation of it throws it into activity obstructing the return of blood to the eye. He would like to ask if in exophthalmic goitre there is an increase in intraocular pressure.

Dr. James E. Lebensohn said that there had been various references made to the relationship of the circulation to glaucoma. Bailliart has found among other things that acute glaucoma occurs most often in individuals with relatively low blood pressure, while the chronic type occurs in those with high blood pressure. The blood pressure in the arteria centralis retinae, as determined by the ophthalmodynamometer, is generally about half of that in the brachial artery. The French investigators have found that the average systemic diastolic pressure in acute glaucoma is 75 mm. mercury, and in chronic glaucoma 110. The retinal diastolic pressure in these cases would accordingly be 37.5 and 55 respectively. It is easy to see how a rise of tension, say to 50, would differently affect these

eyes. In the latter case the circulation of the retina would still be continuous while in the former the capillary circulation would be entirely shut off in the diastolic phase. When the intraocular tension about equals the retinal diastolic blood pressure, the arterial pulse is noted. This condition most commonly prevails in cases with low blood pressure, and hence the arterial pulse is more often seen in acute than in chronic glaucoma.

Dr. Harry Gradle said that the Rouget cells which Dr. Goldenburg had described probably play a great role. These cells are the contractile element of the anatomic capillaries. They are found at irregular intervals in the capillaries. At the beginning and the end of the capillaries the cells are apt to lie opposite to each other, so the contraction of the opposite Rouget cells in the capillary may close either end of the capillary independently. They are common in the intraocular capillaries. Whether or not they are under nervous control is not definitely known, but it is extremely probable that they are under the same vasomotor control as the rest of the circulatory system of the eye. The circulatory system of the eye is under the control of the sympathetics. It would seem that this vasomotor control is one of the most important elements of the eye. Sympathetics, coming from the superior cervical region, enter the skull, and there they form a plexus around the carotid. Two of the branches are of particular interest to the oculist. One passes up thru the Gasserian ganglion and supplies exclusively the dilator fibers of the iris. The other follows the ophthalmic artery into the orbit, enters the ciliary ganglion and thence into the eye along the posterior ciliary vessels. It is this sympathetic that is the vasomotor control of the vessels of the choroid. When there is an increase in systemic blood pressure, there is a preceding wave from the sympathetic plexus. This causes a wave of contraction within the blood vessels of the eye. So when the increased blood pressure comes to the uvea, it does not find the blood vessels in a flaccid state. If it were not for that, the temporary rise in blood pressure that all of us have at times would lead to glaucoma in a large number of individuals.

He could not agree that the extrinsic ocular muscles play a role in the normal formation of the aqueous. If that were so, one would rather expect a dead eye in complete ophthalmoplegia where there is no motion whatever. Exactly the same holds true as to the iris playing a role in the movements of the aqueous. If that were so, the presence of an Argyll Robertson pupil would cause an aqueous stasis. That, of course, is not the case. As for blood pressure having an influence on intraocular tension, that is a moot question. Certain it is that cases with persistently increased vascular tension are not the cases that develop glaucoma. In 1914, Kramer, in Vienna, made a series of tests on cases of glaucoma and a group of the same age without glaucoma. He found that the glaucoma cases had a blood pressure averaging 24 mm. Hg. lower than the nonglaucomatous cases. The Krauss musculature being under the influence of the sympathetic would naturally contract the ophthalmic vein under stimulation of the sympathetic. But at the same time the inflow of blood into the vein has already been stopped by vasoconstriction within the eye. Hence there is not so much blood coming to the vein, owing to the fact that the capillaries have been constricted simultaneously with the vein.

Dr. Michael Goldenburg (closing) said that relative to Dr. Luckhardt's point of differentiation between osmosis and diffusion, he was not sure that he could make a positive statement, but it is known that the epithelium covering the ciliary processes possesses selective properties that will not permit of material foreign to the aqueous passing thru. It has frequently been demonstrated in different pathologic states that this epithelium may become intensely swollen and strip off. The socalled intercellular spaces thru which the fluids must pass are probably artifacts and these spaces, according to newer thought, are filled with a colloidal material with which the fluid elements can enter into combination.

There are many conditions which

will raise the intraocular pressure, e.g., those referred to; toxic material, abnormal transudates, ligation of the venae vorticosae, etc., but these must be discussed at another time when the pathologic states are presented in a future paper. Relative to an elevated intraocular pressure in exophthalmic goitre—he could not recall such a case, but could see no reason why one suffering from this disease might not also develop glaucoma.

Dr. Lebensohn referred to glaucoma, and his points would also be covered in a future paper.

In reply to Dr. Gradle, the circulatory system is in all probability under control of the sympathetics, but it is known that capillaries can contract and dilate independent of this system and independent of the conduct of the arteriole. He was quite sure that the sympathetic system is a factor in this cycle of events, but must maintain that it is a minor factor until better proof to the contrary is presented. As a matter of fact we are not quite so sure that our present knowledge of this system and the autonomic system is absolutely correct. One may say that adrenalin raises the blood pressure, but according to Schilf, if atropin is administered in certain doses first, this is not the case, and the blood pressure may even be lowered. Again, are we sure that a drug acts thru the sympathetic nerves or directly on the organ? It is known that an organ supplied by sympathetic fibers reacts in certain manner or manners to certain drugs.

Schilf in the Klinische Wochenschrift for January, 1927, reports the following interesting experiment: stimulation of the hypogastric of a cat produces relaxation of the uterus, while in a pregnant cat it produces contraction. We know that if eserin is instilled in a normal eye the intraocular pressure is not lowered, but if instilled in a hyperpressure eye it is lowered (with certain exceptions). Schilf seriously questions the presence of the socalled parasympathetic (vagal) fibers. He states that they have never been demonstrated anatomically or physiologically. It has been taken for granted by pharmacologists because of certain reactions that follow the use of certain drugs.

In the complete ophthalmoplegia case referred to, the eye is at absolute rest, the necessity of aqueous humor formation is very limited; thus the capillaries of the ciliary processes are not called upon to function actively. The orbicularis palpebrarum is still active, and by its alternate contraction and relaxation is a pressure applied to the eyeball which should favor the osmosis necessary for the escape of the aqueous into the canal of Schlemm. In addition, the secondary avenues of escape must not be overlooked, the crypts of Fuchs, the anterior surface of the iris and the posterior pole of the eyeball.

Relative to the iris as an aid to the motility of the aqueous in an Argyll Robertson pupil, this iris still reacts to accommodation, therefore can function as an aid to aqueous humor motility.

Too much stress has been laid on the importance of the sympathetic system at the expense of more simple factors that are known and evident.

C. Loeb,
Corresponding Secretary.

THE KANSAS CITY EYE, EAR, NOSE AND THROAT SOCIETY.

April 21, 1927.

Dr. Joseph W. Kimberlin, Presiding.

Tobacco Alcohol Amblyopia.

Dr. Joseph McKee presented a male, aged 67, who came March 11, 1927, complaining of loss of vision in each eye dating back to January 1st of this year. He stated that there was a film before his eyes which prevented his reading or doing his usual work. It has been necessary for him to give up his position in the banking business. Previous to the first of the year he had what he considered normal vision in each eye. His general health has been good. He smoked a pipe, and drinks a moderate amount of liquor, a moderate amount meaning all that he can get. Patient never smoked cigarettes and very seldom smoked cigars. He has been unable to read even large print since the first of the

year. Both eyes seemed to be affected about equally. There is no history of diplopia, no pain. He stated that at first his vision seemed to be better in the evening and worse during the bright part of the day. He disliked the color blue so much that blue objects had been removed from his room.

Examination: External examination of fundi, reflexes and form fields were normal. V. O. D. = 10/200, O. S. = 10/200. In the right eye there was a complete loss of the green field, and a central scotoma for red. In the left eye there was a central scotoma for both red and green, but not for blue. This scotoma extended from the macula to a little to the temporal side of blind spot.

Blood Wassermann was 4 plus. Kahn test was 4 plus. Spinal fluid Wassermann and cell count were negative. There was a questionable vocal cord paralysis. Blood pressure was 160/72. Otherwise physical examination was negative.

A diagnosis of toxic amblyopia was made in spite of the 4 plus Wassermann. Diagnosis was made on the central color scotoma with no contraction of peripheral fields, also because both eyes became affected at much the same time.

After one month of treatment with potassium iodid, and abstinance from tobacco and alcohol, patient's vision returned to 20/30 plus. He is now able to read newspaper print.

In toxic amblyopia there is an involvement of the papillomacular bundle. In optic atrophy of tabes there is a concentric contraction of the field with involvement of this bundle as a late complication.

Spasm of Accommodation.

Dr. J. W. Kimberlin reported a case of a man, aged 32, who came complaining of headaches and reduced vision. He was wearing —1.50 S. both eyes; prescribed by an optician. His vision was 5/9 plus, both eyes. The usual preliminary examination was made, and he was given a prescription of homatropin hydrobromate 2% and instructed to put one drop in each eye at bed time and the following morning one drop in each eye every fifteen minutes for four doses, and to report at the office 45 minutes after the last drop. When he reported the next morning it was found that instead of having both pupils dilated and the near point receding, he could read print up very near to the eye and could not read it beyond 15 cm. and the pupils were pinpoint in size. The distant vision was much reduced, being cleared up only by the use of a —6.00 sphere. Two drops of 2% homatropin, ten minutes apart, were instilled in one eye and in 20 minutes the pupil dilated to 6 mm. and a —3.00 sphere cleared the vision. The other eye remained the same. Homatropin was instilled in the other eye and a new prescription for homatropin was given him with the directions given on the previous day.

Following is the refraction, found the next morning: O. D. — 0.50 S. ⌒ — 0.50 Cx. 135° V. = 20/20; O. S. — 0.50 S. ⌒ — 0.50 Cx. 45° V. = 20/20.

Following the instillation of the first prescription the patient had considerable saliva and later vomited. That prescription was filled by a drug store that double checks all prescriptions, but from the symptoms and physical findings he must have used pilocarpin instead of homatropin.

On investigation it was found that the bottle that contained the homatropin was kept in a cabinet on a shelf just beneath an identical bottle containing the pilocarpin. It is quite evident that the pilocarpin was used by mistake.

Albert Lemoine,
Reporter.

THE MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA.

Section on Ophthalmology and Oto-Laryngology.

February 18, 1927.

Dr. W. T. Davis, Chairman.

Choked Disc with Central Retinitis.

Dr. Oscar Wilkinson reported the case of Mr. J. E. K., who consulted him Dec. 7, 1926, complaining of inability to see with his right eye during the week preceding. He had had no illness during the past five years, until

about two weeks prior to first visit, at which time he had suffered two attacks of very severe headaches not accompanied by vomiting. One week before, he noted his vision was markedly reduced in the right eye.

The lids, conjunctiva and cornea of the right eye were normal. The pupil reacted to light and accommodation, but rather sluggishly. The iris was normal and media clear. Fundus examination showed marked choked disc, about three diopters; in the macular region were to be seen brilliant white streaks radiating from the macula, these covering about two disc diameters, presenting almost a typical picture of old albuminuric retinitis. The veins were much engorged and the arteries at places were obscured by inflammatory exudates. There were a number of minute punctate hemorrhages on and about the disc, the outlines of which were completely obliterated. Vision was reduced to counting fingers at three feet. The left eye was normal in every respect with vision equal to 6/5. The nose was slightly congested, with no pus or exudates or obstruction. There were badly infected tonsils. Teeth were in good condition and roentgen ray showed no abscesses. Urinalysis revealed no sugar but slight traces of albumin. Blood Wassermann was negative. Blood sugar was normal.

Tonsillectomy under local anesthesia was performed Dec. 13, 1926.

Discussion. MAJOR A. G. WILDE said the patient presented by Dr. Wilkinson did not in his history suggest to him the likelihood of choked disc. Choked disc, or papilledema, is known to be a purely mechanical process arising from some interference with the normal venous outflow. It is also recognized that disturbances of vision due to choked disc do not appear abruptly, and when choked disc is present even to considerable degree, the vision may be practically normal.

The patient gave a history of sudden onset with rapid loss of vision. He appeared rather anemic and his general weight and health seemed somewhat below average.

Upon examination of the fundus, there was not found the tortuous veins and well defined fullness of the nerve-head that causes it to project sharply into the vitreous cavity, which we have come to recognize as choked disc.

Rather in the case under discussion was found a wide spread, poorly defined edema and serous infiltration of the retina, showing in the posterior portions large areas of white fatty deposits, with flakes of hemorrhage scattered thruout. Also the involved area was not markedly raised above the level of the surrounding field.

The fact that the urine was reported as normal on one examination was merely an indication for further tests Even tho this shows nothing abnormal at first, a blood chemistry would surely demonstrate a high nitrogen retention

In other words he regarded the condition as one of marked albuminuric retinitis, and of ominous prognostic import as it demonstrated a high degree of kidney dysfunction. The eye signs were but secondary to and symptomatic of the general systemic involvement.

DR. E. R. GOOKIN said he had seen the patient four or five days before he consulted Dr. Wilkinson and had made the diagnosis of papillitis and renal retinitis. He had suggested a general survey but the patient had passed from his observation.

Polyopia.

DR. E. R. GOOKIN reported the case of Miss R. A., aged 25, stenographer, who complained of having had double vision since birth. In reading the letters on the Snellen chart she saw two of each of the test letters with one or the other eye covered. She showed a mixed astigmatism and had normal central vision with correction. Muscular balance normal.

Ophthalmoscopic examination was negative. Dr. Gookin said the various authors of ophthalmic literature gave the following condition as causes of polyopia: "Incipient cataract, subluxation of the lens, luxation of the lens into the anterior chamber, double macula in each eye, vitreous opacities, glass in vitreous, iridodialysis and mixed astigmatism." He was inclined to attribute the polyopia in his case to hysteria.

JAMES N. GREEAR, JR., Secretary.

BROOKLYN OPHTHALMOLOGICAL SOCIETY.

February 17, 1927.

Dr. James H. Andrew, Presiding.

Dural Endothelioma.

Dr. Andrew presented a case in a man of about 45. The earliest symptom was a convulsion which lasted half an hour. Following this the patient was examined at the Brooklyn Hospital but no diagnosis was made. Eight months later he had a second convulsion. The eyegrounds were negative at this time. Two months after the second convulsion the right fundus showed choked disc, followed in three days by edema of the left disc. At this time a brain surgeon advised against operation, thinking the case one of glioma. The patient was sent to Dr. Harvey Cushing of Boston and he discovered a meningioma about the size of a tangerine. Hemorrhage was rather severe, the blood was saved and filtered and when his pressure became low, it was reinfused. Sometime later there ensued complete hemiplegia, which cleared up entirely. At the end of six months there was restoration to normal. Condition has remained so for over a year.

Craniopharyngeal Pouch Tumor.

Dr. George Freiman reported a case which appears in full on page 579.

Glioma of Third Ventricle.

Dr. Rogers reported on a patient, aged 19, who noticed frequency of urination and an increase in the amount of urine passed. Four months later vision began to fail. Eight months later roentgen ray of skull showed deformity of sella turcica, with apparent destruction of the posterior clinoid processes and floor of pituitary fossa. Eye examination at this time showed pupils 5 mm. in diameter. They reacted slowly. Tension was normal. Vision in each eye was 10/200— improved to 15/200. Optic nerveheads were white in color with indistinct edges and markings of lamina cribrosa. Minute vessels of disc were missing. Diagnosis was secondary optic atrophy. Fields of each eye showed nearly complete temporal hemianopsia with contraction of other segments. Diagnosis of a tumor in the region of the middle fossa, possibly pituitary, was made. Spinal fluid was under pressure and the roentgen ray examination showed no evidence of enlargement or erosion of the sella turcica. One month later fields showed complete temporal hemianopsia on the right side and the left fields were markedly contracted generally. The pallor of the nerves had increased and the vision had fallen to 10/200 corrected. Later a right sided subtemporal decompression was performed with relief for the first two weeks. Then the flap began to bulge and there were occasional attacks of vomiting. Three weeks after the first operation decompression was performed on the left side. The patient died several weeks after the second operation and the autopsy showed a spreading glioma of the third ventricle and optic chiasm.

Endothelioma of the Orbit.

Dr. John Bailey reported on a patient, aged 12. The lesion began with a small lump in the middle of the left upper lid. Two months later the lid was swollen and hung over the eye No examination of the eye could be made until the lid was lifted. Incision into the lid showed an infiltrating mass extending into the orbit as far as the posterior ethmoidal crest. It also had extended into the lower lid and conjunctiva. Shortly after removal there was recurrence in lower lid. Exenteration of orbit was performed. Dr. Verhoeff's pathologic report was lymphangioendothelioma.

Wm. F. C. Steinbugler,
Secretary.

BALTIMORE MEDICAL SOCIETY.

Section on Ophthalmology.

March 24, 1927.

Dr. Wm. H. Wilmer, President.

Ophthalmoscopy by Indirect Focal Illumination.

Dr. Harry Friedenwald said the intensity and the area of illumination of the retina in ophthalmoscopy influence the clearness with which the fundus is seen. For this reason we all prefer

for our routine examinations, instruments and lamps which produce a diffuse illumination of the retina; this is irrespective of whether we are using the socalled reflecting or the electric ophthalmoscopes, in examination by the direct or the indirect method.

A number of years ago in using the small concave mirror of the Morton ophthalmoscope with a very bright unglazed 100 W. Mazda short filament lamp, thus producing a sharply focused image of the light source on the retina, the speaker found that the light which passes thru the retina is reflected diffusely by the underlying structures and illuminates the neighboring retina—but with the peculiarity that it is transmitted thru the retina from the outer layers inward. The appearance of an area so illuminated will often differ entirely from that seen in the usual direct illumination. This fact struck the speaker most forcibly in the examination of cases of central senile chorioretinal degeneration. (Fig. 1.)

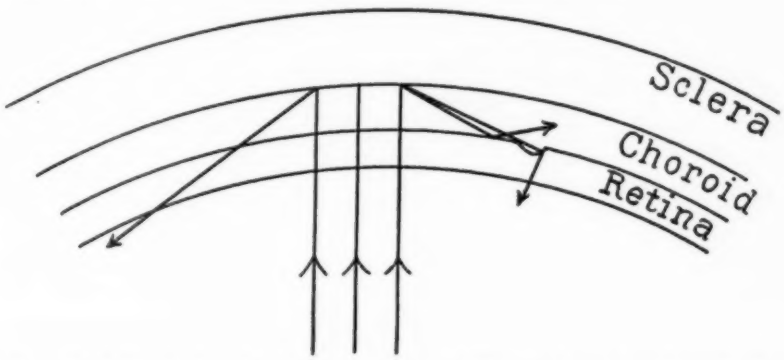


Fig. 1. Indirect focal illumination showing course of rays falling on internal surface of sclera and diffused thru choroid and retina.

It is not rare that we meet with patients who have passed middle life who suffer from defects of central vision in the form of very small central scotomata, but who present very slight, often scarcely recognizable, changes in the macula when examined by the common methods of ophthalmoscopy with diffuse illumination. The method of indirect focal illumination brings out clearly pigment accumulation and pigment atrophy in these cases. The advantage of slightly shifting one mirror to and fro in the examination and recognition of colloid excrescences of the choroid has long been known. By the method of indirect focal illumination mentioned above, their highly refractile character becomes very manifest.

It was after applying the method of indirect focal illumination for several years that the speaker discovered that the method had been described in 1910 by Haab in Deutschmann's Beitraege (vol. 8, p. 301). Haab points out other conditions in which the advantage of ophthalmoscopy by indirect illumination is marked—namely, detachment of the retina; the swollen folded retina around a choked disc.

It is interesting that Haab refers to Nagel's use of indirect illumination in 1864 in the examination of the retinal blood vessels, and to its mention by Liebreich and by Mauthner. Haab's paper was referred to by Gifford in 1913 (Ophthalmoscope v. 193) who bore testimony to its value and Burdon Cooper in the same year and journal (p. 721) termed the method "excentric illumination." Haab reverted to the subject in 1916 (Augenspiegel Studien, Arch. f. Augenheilk., v. 81, p. 1). Finally Dimmer (Der Augenspiegel, 1921, p. 86) mentions the advantage of throwing the image of a bright light just beside the part to be examined for the detection of fine folds or slight detachment of the retina.

The purpose of this note was to urge the use of this method which has proved so useful to the speaker and which—as the absence of all mention in literature aside from the references given would indicate—is not generally known. The method may be used also

with an electric ophthalmoscope provided the instrument is so adjusted that an image of illuminating filament is formed upon the observed retina.

Discussion. Dr. Jonas S. Friedenwald said that having been taught the method by his father he had used it for some years with much satisfaction. It was important that an image of the light source should be sharply focussed upon the retina so that the surrounding halo should be formed entirely by the reflected light. Under these circumstances the halo will have a deep red color, for the light forming it is filtered thru the vascular bed of the choroid. For this reason the halo can be abolished by using green light and can be greatly exaggerated by using red light. It is, therefore, of some advantage to insert a red filter in the illuminating beam when this method of examination is used.

The use of red light in ophthalmoscopy was first suggested by Ginestous who pointed out that owing to the transparency of blood to this light the distinction between small hemorrhages and small masses of pigment could be facilitated. When red light is used for focal indirect illumination, fine irregularities of pigmentation both in the retinal and choroidal pigment are most readily recognized.

Pathology of the Optic Foramen.—A Roentgenologic Study.

Dr. Harry Goalwin reported the results of a study based on the roentgenologic examination of the optic foramena of over 1000 cases. After a brief review of the normal anatomy and roentgen ray appearance of this region he showed slides illustrating the appearance in fractures of the optic foramen, narrowing of the foramen due to exostoses of its wall, enlargement of the foramen due to tumors of the optic nerve, malformations of the foramen associated with oxycephaly and other diseases of the cranial bones. The normal variations in the appearance of the foramen were discussed.

Regarding technic, the speaker emphasized the importance of having the central ray of the roentgen ray system pass directly thru the axis of the canal, as otherwise an apparent narrowing will be produced due to the overriding of the shadows of the walls

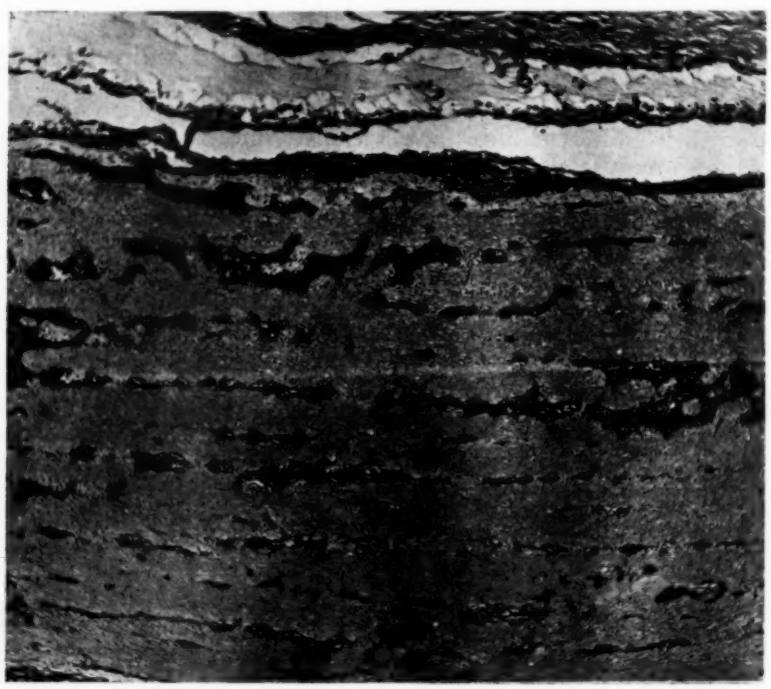


Fig. 2. Section of optic nerve showing its invasion by dural endothelium. (J. S. Friedenwald.)

of the tube. In adults this can be obtained by projecting the shadow of the foramen near the lower outer margin of the shadow of the orbit. For children suitable adjustments must be made depending upon the age of the subject. Lateral views of the foramen can also be obtained by proper adjustment of the photographing system. A simple formula enables one to calculate the exact dimensions of the canal from the size of the shadow in the roentgen ray plate.

A more adequate summary of this valuable paper cannot be given without presenting in full a number of Dr. Goalwin's case records and illustrations, publication of which is reserved for a later date.

Intracranial Tumors with Extension Thru the Optic Foramen.

Dr. Jonas S. Friedenwald called attention to the very small number of cases of this kind that have been reported. The rarity of these cases was more apparent than real, for in a series of 50 consecutive cases of brain tumor in which at autopsy material from the orbits had been obtained for study, two cases had been found in which the tumor extended thru the optic foramen. One was a case of carcinoma of the pituitary, one a case of dural endothelioma. Roentgen ray examination of the optic foramina of these cases would have aided in the antemortem recognition of their inoperable character.

Altogether six similar cases were found in the literature. These included a carcinoma of the pituitary reported by Pechkranz (Neurolo. Cent. 1899); three cases of metastatic carcinoma of the meninges (Cords: Deutsch ophth. Gesel. 1922, p. 293, and Ginsberg: Klin. Monatsbl. f. Aug. 1921, v. 67, p. 232, and also Cohen and McNeal (Arch. of Oph. v. 50, 1921, p. 128), and also two cases of lymphosarcoma of the meninges reported by Delord (Ann. d'Ocul. 1923, v. 160, p. 16) and Leport and Vandeuvre (Ibid 1924, v. 161, p. 663).

Jonas S. Friedenwald,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

February 19, 1927.

Dr. Melville Black, Presiding.

Unusual Lens Opacity.

Drs. Wm. C. and Wm. M. Bane showed M.C., aged 61, who stated that he had had several attacks of acute iritis in both eyes in the years of 1894 to 1901. Some lens opacities had been noted 30 years previously. At the time of his last refraction, his vision uncorrected, was R. 5/30+; L. 5/12, improved with correction in either eye to 5/7. The fundi appeared healthy; the discs normal. Similar lens opacities were present in each eye.

Discussion. Dr. Edward Jackson remarked that the peripheral lens opacities were deep and evenly distributed, therefore resembling the congenital coronary opacities. The central opacity which did not look like a congenital one but rather as a complicated cataract was possibly due to the recurrent attacks of iritis. The corneal microscope might show whether or not these opacities were progressive.

Dr. Wm. H. Crisp believed the opacities were those of a complicated cataract; that the case should be watched and notes taken in order to form a clear idea. He did not think it necessary to make highly differentiated classifications from a clinical standpoint.

Dr. J. A. Patterson thought the underlying pathology should be given more consideration as these types of opacity are dependent upon the nutrition.

Superficial Punctate Keratitis.

Drs. Wm. C. and Wm. M. Bane brought F.I., aged 19, seen for the first time Dec. 17, 1926. He had put on glasses because of poor vision. His vision had been satisfactory for a week with correcting lenses, but at the end of this time, vision in the right eye began to fail. At the time of examination, vision R. was 5/15—2; L. 5/75—2. With glasses, R. 5/10—1; L. 5/4—2. The eyes showed no congestion but only changes which were confined to the superficial layers of the cornea of

the right eye. The surface of the cornea was uneven in its entire extent. At no time had there been any tendency to ulceration. Vision could not be improved. A diagnosis of superficial punctate keratitis was made and a prognosis of gradual improvement within the next two months.

Discussion. Dr. Wm. H. Crisp stated that he saw no nodules but did see some filamentous opacities and a peculiar disturbance of the refractive media. He did not believe the case was one of superficial punctate keratitis.

Dr. J. A. Patterson suggested study as to the anesthesia of the cornea and an exhaustive study for foci of infection.

Dr. Edward Jackson, with the ophthalmoscope, noticed a disturbance of refraction, and with oblique illumination, superficial and deep opacities were seen. This type of lesion is seen in parenchymatous keratitis also, therefore, a Wassermann was suggested, but in all probability a focus of infection exists. There may be a nerve lesion.

Dr. C. E. Walker believed the lesions were due to focal infection and cited a case of similar nature which cleared up entirely with the removal of soft tissue about the teeth.

Dr. John McCaw stated that there were deposits on the posterior corneal surface.

Dr. Melville Black said that the cornea was anesthetic and that the mouth should be studied with the roentgen ray for impacted teeth.

Dr. Wm. M. Bane stated in closing that there were no deposits on the posterior surface of the cornea and that the infiltrates were superficial.

Toy Arrow Contusion Involving Pupil and Choroid.

Dr. W. H. Crisp presented a boy, aged 8, who on November 12, had been struck in the left eye with a toy arrow fired by a six year old playmate. The disturbances primarily observable included an abrasion of the conjunctiva, a decided rupture of the pupillary margin upward and inward, moderate hemorrhage in the anterior chamber, and wide dilatation of the pupil. Several hours later it was possible to make out a small hemorrhagic area and a small exudate, both probably near the macula. (The eye was very unsteady.) The vision of the eye at this time was counting fingers at eight inches. Next day, four or five other minute notchings of the pupillary border were noticed, and the pigment at the pupillary border seemed to be missing in places, while close to the temporal side of the pupil there was what looked like a long line of pigment on the anterior capsule. There was a marked increase in refraction in the central area of the pupil, apparently due to swelling of the anterior lens cortex, and a number of delicate markings were noticeable in this part of the lens. There was some retinal edema, and the retinal vessels were tortuous. The disturbed refraction of the lens lasted only two days, and the deposit of pigment or blood on the anterior capsule had practically disappeared within the same length of time. The final results of the injury were visible and permanent mydriasis, with notching of the pupil; a fairly long (three or four disc diameters) choroidal tear, heavily pigmented, about 1.5 disc diameters downward and outward from the disc; a small incomplete secondary tear or hole, not pigmented and not entirely white, just above the macula, and measuring four or five primary vessels in the vertical and two or three primary vessels in the horizontal diameter; and a distinct area of incomplete choroidal atrophy at the upper nasal margin of the disc. In spite of the mydriasis, the accommodation of the injured eye was 9.5 diopters. Vision had recovered to almost 20/20.

Discussion. Dr. John McCaw mentioned that cases of rupture of the choroid when seen early are frequently masked because of an intense edema of the retina.

Dr. Edward Jackson reported a case he had seen one hour after the patient had been struck in the eye with a marble. A large clear area of edematous retina was seen with a streak of acute choroiditis which was yellow in color. In four days the retina had cleared and the yellowish streak was less pronounced. Ultimately the eye returned

absolutely to normal and with no evidences of atrophy.

Dr. Melville Black thought that the pupil which was now moderately dilated would return to normal in about six months.

Dr. Wm. H. Crisp agreed that the preliminary edema accompanying these injuries is an important point, and that it frequently does mask the ophthalmoscopic picture.

Pseudoneuritis with High Hyperopia.

Drs. Wm. H. Crisp and James M. Shields presented a boy, aged 10, who had in both eyes a fundus condition rather closely simulating neuroretinitis. The boy was a patient of a tuberculosis sanitorium. In December, 1926, he had had an iridocyclitis, first in the left eye and then in the right eye, which cleared up rapidly after removal of a badly abscessed tooth. Altho at first there was some suspicion of a neuroretinal disturbance complicating the same infection, the fundus appearance and the vision remained unaltered over a fairly long period of observation. The refractive error called for R. +3.75 sphere ⊃ +3.25 cyl. ax. 109°, L. +3.75 sphere ⊃ +3.25 cyl. ax. 74°. Both as to the disc and retina, there was a decidedly varying protrusion of the blood vessels, with marked tortuousity. There was also a great abundance of retinal reflexes. However, at no time was there any trace of hemorrhage or exudate in the fundus. The corrected vision of each eye was approximately 20/40.

Discussion. Dr. J. A. Patterson asked whether or not a case of pseudoneuritis ever gets normal vision.

Dr. Edward Jackson answered that most cases do not get full standard vision but nearly so and that he had seen three cases with full standard vision.

Dr. George F. Libby stated that the ophthalmoscopic picture was greatly improved when viewed thru the patient's correcting lenses.

Dr. Melville Black objected to the term pseudoneuritis. He stated the case was simply one of high hyperopia with hyperopic astigmatism and that if correcting lenses are worn, the vision will improve within two or three years to about 20/20.

Dr. Edward Jackson explained that the term pseudoneuritis means an actual swelling of the disc of four or five diopters but that there were no evidences of optic neuritis.

Donald O'Rourke,
Secretary.

THE MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

April 12, 1927.

Dr. P. M. Farrington, Presiding.

Congenital Fundus Anomaly.

Dr. Ellett showed Ellen B., aged 6, who had had some trouble with the left eye all of her life. The eye was normal externally, but vision was only perception of light. There was some pigment around the disc, especially to the temporal side, and lying on this pigmented area to the temporal side of the disc, but not quite touching it, was a smooth, oval, bluish white mass that looked like a cyst. It was about three by four disc diameters in size, not movable and no structure or vessels could be made out in its walls. While bearing some resemblance to cysticercus, the condition was thought to be a congenital anomaly in the shape of connective tissue formation. The right eye was normal.

Lagrange Operation.

Dr. P. M. Lewis presented E.R., colored, male, aged 59, who was seen first on March 22, 1927. He complained of failing vision for the past 4 or 5 years. Left eye was operated upon about three years ago, but became blind shortly afterwards.

Vision O.D. equaled hand movements; O.S. no perception of light. Eyes were not congested. O.D. pupil was widely dilated and did not react to light or accommodation. Marked glaucomatous atrophy of disc and about 5D cupping were present. Retinal vessels were greatly attenuated and retina was atrophic. Peripheral field of vision was almost entirely lost. Tension O.D. equaled 52 (Schiötz); O.S. tension 40 (Schiötz). There was an operative scar of old trephine above; iris was caught in wound, so that pupil was just a narrow crescent

at upper margin of cornea. Blood was negative for lues.

On March 25, a Lagrange operation was performed on the right eye. There were no postoperative complications. Atropin was used for the first few days and light massage after the second day. Patient was discharged on fourth day. The tension O.D. was 18, O.S. 40 (Schiötz). No miotics had been used.

Case 2. A. M., colored, aged 31, was seen on Jan. 11, 1927. The only complaint was a gradual loss of sight of the left eye, beginning about 18 months ago. The vision was O.D. 20/30, O.S. hand movements. The size and reaction of both pupils were normal. Tension O.D. was 48, O.S. 51. The disc of the right eye showed an early stage of atrophy and cupping. In the left eye the atrophy and cupping were marked and the vessels on the disc were pushed over the nasal margin. The field of the right eye was normal both for form and colors. The blind spot was of normal size and there were no scotomata connected with the blind spot. The field of the left eye was entirely destroyed, except for a small area temporally where he could see moving objects. Central fixation was absent. Blood was negative for lues.

The patient did not report for operation until January 29, when a bilateral Lagrange operation was performed. Atropin was used postoperatively for the first few days and light massage after the second day. The tension was taken at four different visits since operation. It was always found to be about 23 O.D. and 18 O.S. (Schiötz), no miotics had been employed. The vision was O.D. 20/40, with a pin hole disc 20/30, and O.S. hand movements.

Unilateral Trachoma.

Dr. M. B. Seligstein presented this case for two reasons, first, because of the rarity of trachoma in one eye and second, the rarity of trachoma in a negro.

L.C., aged 37, colored, whose father was an Indian, was first seen in 1922. The right eye showed a well developed case of trachoma with numerous trachoma granules involving the lids and fornices. At this time the lids were well rolled with trachoma forceps and the patient was given 5% copper citrate solution to use at home as she lived a good distance from the city.

The patient was not seen again until April 10, 1927, at which time she presented the same condition as seen on first examination, with the added symptoms of a well developed pannus above; a striate ulcer of the cornea above; several small ulcers below.

She stated that her eyes had not given her any trouble during the past five years, but about two months ago the trouble returned. Under general anesthesia the lids and fornices were again rolled. Atropin and White's ointment were applied.

Discussion. Dr. Phil Lewis said this case was seen about one year ago at the clinic and had a similar condition with a diagnosis of trachoma. He looked up the records and found two cases one of which he was able to locate and proved to be follicular conjunctivitis. This condition is rare and he is inclined to believe that its occurrence here is due to the fact that her father was an Indian.

Dr. J. B. Stanford was forced to agree with Dr. Seligstein. While an associate of Dr. Ellett he had one case which looked like trachoma but was a follicular conjunctivitis. This is the only true case of trachoma in a negro he had ever seen.

Dr. Ellett said when trachoma is seen in a negro, you either doubt the diagnosis of trachoma or doubt he is a negro. This is the first case of trachoma in a negro Dr. Ellett had seen.

Dr. Gill recently admitted a case of trachoma in a negro at the Veterans' hospital, duration one year.

Dr. Simpson had a case of trachoma in a negro and has had two or three in the past which got well.

Pituitary Tumor.

Dr. John J. Shea presented the case of E.G.H., aged 38, who had gradually lost his vision, first in the left eye and subsequently in the right eye. Examination of the nose showed a pansinusitis. The roentgenogram confirmed these findings and demonstrated a tumor in the sella turcica which was invading his sphenoidal region. At operation the roof of the sphenoid was bulged downward and obliterated the

upper half of its cavity. The eye examinations were by Dr. Stanford and would be reported by him. An attempt would be made to remove this tumor by the transphenoidal route.

Dr. Stanford saw this case in consultation.

On March 22, Dr. Stanford examined the eyes of E.G.H. At that time the right eye was blind and the vision in the left eye was limited to 6/200, eccentric. This vision could not be improved. The right disc was quite white and the left very pale. The right pupil reacted consensually but not to direct light.

The left field of vision was contracted but the limits were rather indefinite due to the poor vision. There was an absolute scotoma occupying almost all the superior temporal quadrant.

On Apr. 7, 1927, the left vision was limited to moving objects on the temporal side.

Discussion. Dr. Ellett asked if the discs appeared to be waxy as reported by the Mayo clinic in similar cases.

Dr. Simpson suggested that the nose would be the best route in this case as the anterior wall had already been removed.

Simple Glaucoma Treated with Glaucosan.

Dr. M. B. Seligstein reported the case of W.H.S., aged 57, first seen Nov. 23, 1926. He complained of headache and could not see clearly; things looked blurred. Mother and two brothers were blind from glaucoma. Refraction was as follows: Vision with O.D. 15/100, with +0.75 S. ⌒+0.25 cyl. ax. 90° vision =15/15. Vision with O.S. = light perception; unimproved with glasses. With +2.50 S. added the patient read Jaeger 1 with the right eye.

Examination: Pupils were about 1½ mm. Anterior chamber was shallow. Discs were not seen very well. Patient had been using pilocarpin. Tension right eye equaled +2 with fingers. Tension left eye equaled +2 with fingers. Field of vision showed some apparent peripheral cutting in right eye. This was marked in the left eye. Eserin was started at once. Operation was advised if no improvement.

Dec. 3, 1926, tension Schiötz, O.D. 25. O.S. 35.

Dec. 16, 1926, tension Schiötz, O.D. 25. O.S. 35.

Jan. 1, 1927, tension Schiötz, O.D. 19. O.S. 25.

Feb. 10, 1927, tension Schiötz, O.D. 19. O.S. 24.

Feb. 22, 1927, tension Schiötz, O.D. 19. O.S. 35.

Glaucosan was instilled in both eyes five times at 15 minute intervals.

Tension after third drop, was, O.D. 19, O.S. 33.

Tension after fifth drop, was, O.D. 19, O.S. 25.

Patient was next seen Feb. 28, 1927. Tension O.D. was 19, O.S. 25. Tension had remained down for the past nine days.

Apr. 12, 1927. Tension O.D. 25, O.S. 44. Started eserin again.

Conclusion from first case: Holds tension down for ten days.

Dr. Ellett reported further on the patient with chronic glaucoma, treated by glaucosan, who was shown at the last meeting. The effect of the treatment was obtained by a subsequent application of the glaucosan. As soon as the effect wore off the tension went up again and was not kept down by miotic drugs. Accordingly, operation was advised and the eye was trephined on April 11th.

M. G. Seligstein, Secy.

ANNOUNCEMENTS.

The International Congress of Ophthalmology will be held at Amsterdam in September, 1929. Details regarding the conference, at which it was decided that the International Congress of Ophthalmology be reconstituted, will be published in our next Journal.

The special Course for Postgraduate Study in Ophthalmology to be given at Vienna, October 1 to December 6, 1927, was announced in this Journal in April, p. 309. A cable message from Dr. A. Fuchs informs us that the class has been filled. This Course is given entirely in English. It has proven so popular that probably it will be repeated about the same time each year.

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PROGRESSIVE MYOPIA.

The problem of progressive myopia is of such importance that its study has engaged an enormous amount of time and effort. Though numerous hypotheses as to its cause have been advanced, no one has yet been proved, and we are still open to new thoughts on this subject. It is, therefore, with interest we note within the last few months the advancement of two new ideas on myopia.

That neither of these hypotheses includes near work as a factor, indicates the tendency to discredit the view that was generally accepted formerly that convergence and accommodation for one reason or another were almost certainly related to the development of myopia.

Meyer Wiener reports 27 cases in which he believes that the instillation of epinephrin in the eyes has compensated for a lack of this drug in the system and that progressive myopia may be associated with insufficiency of this drug. He thinks that this lack of activity of the suprarenals may be on account of pressure on these organs when the individual assumes chronically a stooping posture.

His cases in general show a recession in the progress of the near sightedness.

Except for the empiric tests, his chief reason for thinking that there may be an insufficiency of epinephrin is because he assumes that a deficient metabolism causes a scleral weakness and that lowered metabolism occurs in those who do not take a normal amount of exercise. Since the epinephrin output of the glands is increased by exercise and since myopic people are inclined to be sedentary, it seems to Wiener that probably their epinephrin output is low.

Dr. J. D. Wood also believes that progressive myopia is a deficiency disease, but he thinks it may be a calcium lack as he has found a marked lowering of the calcium content of the blood in practically all of the myopic cases in which he has been having calcium determinations made, when these tests were carried out while the individuals were still in the period of growth. He has not had opportunity to determine the results of calcium therapy in these patients but he has used a calcium chlorid intravenously and later parathyroid successfully in vernal catarrh, especially of the bulbar type, in which he has found a similar calcium deficiency. Why the same de-

ficiency should be associated with vernal catarrh in one person and myopia in another is not discussed.

The calcium content of the blood is very stable and any change in it is notable. The quantitative analysis of calcium in the blood is, unfortunately, very difficult and most workers have found trouble in increasing the calcium by any method.

The suggestions of these two workers at least give leads which others may follow, and it is hoped that further studies will test these hypotheses.

L. T. P.

DISADVANTAGE OF THE ELECTRIC OPHTHALMOSCOPE.

As against the decided convenience which the electric scope affords, there should be placed the danger that it may lead to the neglect of the older type, and especially of the use of the indirect method of examination. I have observed that the younger men who early become accustomed to use the electric scope tend not only to neglect the indirect method, but to fail altogether to learn it. This is unfortunate because the indirect method permits a much more rapid and accurate observation of the extent of the fundus lesions and of their location with reference to the disc, macula and periphery, than can be easily obtained with the direct method. Furthermore, with the ordinary type of scope one can get a much wider range of intensity and character of illumination and a longer working distance than is possible with the electric instrument. In discussing this matter recently with Dr. Suker, he told me that he felt so strongly on the subject that he did not permit his students to use the electric scope till they had mastered the ordinary one. If one were obliged to choose between the exclusive use of either direct or indirect examination, the direct method should undoubtedly have the preference; but to reject the former is comparable to working solely with the high power of the microscope.

H. G.

DISPENSING OPTICIANS.

The sudden extension of the use of lenses that followed the discovery of the influence on the general health of optical defects in the eyes and their intensive and protracted use to meet the needs of our civilization, caused confusion in the aims and standards of opticians. It opened a short cut to the financial success of medical quackery, promised pseudoprofessional standing without education, and offered purchased publicity as a substitute for achieved reputation, based on acquired skill and square dealing. It also fostered the overshadowing development of large manufacturing and commercial interests.

These things interrupted the normal development of the business of supplying the optical needs of the people, which have been going on for centuries and has a most honorable and interesting history. The supplying of spectacles had been associated with the perfecting of microscopes and telescopes, and the making of lenses for light houses and the newly developed art of photography. Oldfashioned opticians were displaced by department stores and optometrists; and the change was not in the direction of better service to the public. Real advance in the better fitting of spectacles and eyeglasses, increased accuracy in the manufacture and placing of spectacles, did not go forward in keeping with the development of optical science; but was obstructed and lost sight of, in the application of get-rich-quick methods.

Recently there has been established the Guild of Dispensing Opticians. It is a movement to secure true specialization in the field of applied optics, a field that has grown large enough to justify specialization. Skill and accuracy in the placing of lenses in their most helpful position before the eyes, and sound judgment as the artistic harmony of frames with the lines of the wearer's face have not developed with the production of new forms of frames, or the changing fashions in them, that are so favorable to the manufacturer and salesman. It is time that the service, that was performed

by the opticians of a former generation, should be extended to help the greater number of spectacle users of today. The greater accuracy and improved forms of optical helps for the eyes of the present generation should have better application to individual needs. The public and the medical profession are to be congratulated on receiving help from skilled intelligent fitters of spectacles, who do not desire to pose as quack "doctors," but see the real service they can render, and take a pride in making lenses more efficient and helpful, whether this work is called a "profession" or not.

The advent of individuals and firms that are willing and prepared to render true service, should be recognized and welcomed by all ophthalmologists, who understand and appreciate the importance to the wearer of having the right spectacles in the best position before his eyes. In Buffalo where the second annual meeting of the Guild of Dispensing Opticians of America was recently held, it was demonstrated that helpful and pleasant relations can be maintained between oculist and optician, where both parties are devoted to serving the interests of the public, and not to fighting each other for the opportunity to gather dollars by pretended service.

In Buffalo there are eight firms belonging to the Guild of Dispensing Opticians; in Philadelphia, where the Guild started, there are 19; and the total membership in the country is over 80. It is desirable that whereever there are doctors of medicine capable of measuring ametropia and prescribing lenses, there should be dispensing opticians, who can and wish to fill such prescriptions. Wholesale dealers and manufacturers who hire someone to fit the frames and get the oculist to mail or telephone in his prescription and receive a rebate on the price charged for the glasses, do not give the best fitting of spectacles or eyeglasses. Where no competent optician is found to do this fitting, the oculist may be compelled to do the best he can at it himself, and to this extent to compete with dealers in spectacles. But if he is really interested in opthalmology, he will be glad to turn over this work to a dispensing optician. But it must be recognized that dispensing opticians can only exist where oculists are willing to cooperate with them.

E. J.

BOOK NOTICES

Atlas of Photographs of the Human Fundus by **Prof. Friedrich Dimmer,** Vienna, and **Dr. Arnold Pillat,** assistant, II Eye Clinic, Vienna. Cloth, published by Franz Deuticke, Leipsig and Vienna, 1927. Price 60 marks.

This book consists chiefly of a collection of photographs of the human fundus, the material for which was prepared by Prof. Dimmer before his death, and subsequently by Dr. Pillat. A few have been supplied by other men, to whom credit is given. The preface is by Dr. Pillat. It is followed by an introduction, which is a general discussion of the subject of photography of the fundus, especially in reference to the pictures in the book. The remainder of the book consists of six divisions, each containing a varying number of plates, facing their descriptions. Preceding the first part is an index to all of the plates and illustrations, and at the end is an alphabetic index, so that it is easy to find the picture one desires to see.

Part I deals with the normal fundus and congenital anomalies. There are 14 plates each containing four illustrations, except Plate I, which is a picture of the normal fundus. Part II, Changes at the Discs, 6 plates, each 4 illustrations. Part III, Changes in the Optic Nerve, 9 plates, each 4 illustrations. Part IV, Diseases of the Retinal Vessels, 12 plates, each 4 illustrations. Part V, Retinal Changes, 24 plates, each 4 illustrations. Part VI, Changes in the Choroid and Foveal Region, 19 plates, each 4 illustrations. In all there are 333 illustrations.

The plates are printed on heavy paper so that the reproductions are excellent. The apparatus used eliminates

the two white spots which mar the pictures taken by the Nordenson camera. The pictures, of course, are plane surfaces and lack the spatial features of ophthalmoscopic examination. Then, too, without the accompanying history and description, it might be difficult to make the correct diagnosis from some of the pictures. In the third place, the absence of colors, as found by ophthalmoscopy, is a disadvantage. With these limitations one can hardly be too enthusiastic about this book. Photography of the fundus, the latest ophthalmologic aid, is bound to become one of the most useful resources in our possession, especially for the permanent recording of data. With a work of this kind as a standard, the value of this method will be greatly increased and its use amplified. Even if one cannot read German, so many of the legends resemble their English equivalents, that it is easy to understand them. Every oculist should possess a copy of this work.

C. L.

Sehnervenbefunde bei Carcinomatose, Sarcomatose und Gliomatose der Meningen. Dr. Maximilian Nitsch, Vienna. Paper, 8vo, 102 pages, 1 color plate, 13 ill. Berlin: S. Karger, 1927.

This monograph brings together from the literature the conditions, observed and reported, where these malignant tumors, generally metastatic, have involved the regions of the optic nerve tracts. Dr. Nitsch is an assistant in Prof. Meller's Clinic and has availed himself of the opportunities there afforded; but he has also searched widely, analytically and with judgment, in the literature for the observations, which are made more valuable by this intelligent grouping of them.

Carcinomatosis is first considered, 54 pages, including metastatic hypernephroma and chorioepithelioma. The bibliographies to this part of the book include references to over 150 papers, 15 of the writers being Americans, and several of the cases having been reported in this journal at dates running up to 1926. The sarcomas, including angiosarcomas, endotheliomas and peritheliomas, occupy 15 pages, with 49 references. Under gliomatoses, 20 pages, are included such widely varying tumors, as retinoblastoma ("glioma oculi"), cerebral glioma, and neuroblastomas. A supplement of 8 pages takes up the lymphomatoses, lymphosarcoma, chloroma, etc.

The illustrations are photomicrographs of tumor invasions, and the color plate represents an ophthalmoscopic view of an involved optic nervehead and retina. Metastatic involvement of the cerebral meninges in carcinomatosis is rare. This collection of facts regarding the visual tracts will be a valuable contribution to the general pathology of malignant disease.

E. J.

Lead Poisoning. J. C. Aub, L. T. Fairhall, A. S. Minot and **P. Reznikoff.** Cloth, 8vo, 275 pages. Illustrated. Baltimore: Williams and Wilkins Co., 1926.

This is volume 7 of the series of "Medicine Monographs," put out by the publishers. It is divided into I, Chemistry, 114 pages; II, Pathology, 16 pages; III, Physiology, 116 pages; IV, Clinical, 40 pages; a chapter on the Prevalence of Industrial Lead Poisoning in the United States, by Alice Hamilton, 10 pages, and a Bibliography, 23 pages, 500 references.

The optic lesions due to lead are considered in the chapter on general clinical descriptions and diagnosis. The involvement of the optic nerve is the only known affection produced by lead among the nerves of special sense, altho the palsies of motor nerves are widely distributed. The optic nerve lesions really belong with those of the central nervous system, and a whole chapter is devoted to meningoencephalopathy.

Toxic amblyopia and ocular palsies due to lead have long been known, but are often overlooked. This book gives a broad view of the nature of lead poisoning, that should help to a better understanding of some of the obscure problems presented to the ophthalmologist and neurologist.

E. J.

The American Medical Association of Vienna. Paper, 12mo, 248 pages. Printed by the Association, Alserstrasse 9, Vienna VIII. 1927.

The pocket reference book to the graduate medical teaching offered in Vienna, should be known to all students who go from other countries to profit by the opportunities offered by this great medical center. It answers the questions that arise when planning to study in Vienna, as well as those that become urgent on arriving in that city.

The courses on ophthalmology occupy 9 pages, telling of the Eye Clinics and the work of Fuchs, Bachstez, Safar, Kolmer, Sternberg, Lauber, Hanke, Mueller and Sommer. The full list of instructors fills 7 pages and includes 277 names. There is also a list of members of the Association, who have joined it or have been in attendance within the last four years. This list occupies 32 pages and includes students from all parts of the world. Advertisements supposed to be of interest to students of medicine are not excluded from this handbook and often carry information that will be of value.

E. J.

CORRESPONDENCE.

Orbital Parasites in Hawks.

To the Editor:

In C. M. Woodford's book on the Solomon Island (a Naturalist Among Head-hunters, London, 1890, p. 57) I have just come across the following:

"Several species of small hawks of the Genus Astur are met with. I have noticed a curious fact when skinning the birds, viz: that the eye sockets in nearly every instance were infested with small white thread-worms. These did not seem to interfere in any way with the bird's power of vision, as the specimens were all well nourished and in good plumage." This might indicate that when, in some patient from the tropics, a thread-worm is found careening about beneath the conjunctiva, or in the interior of the eye, there may be no need for a hazardous operation to remove it.

HAROLD GIFFORD.

Omaha, Nebraska.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply news from their respective sections: Dr. H. Alexander Brown, San Francisco; Dr. Wm. Thornwall Davis, Washington; Dr. Gaylord C. Hall. Louisville, Ky.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. George H. Kress, Los Angeles; Dr. Edward D. LeCompte, Salt Lake City; Dr. W. H. Lowell, Boston; Dr. G. Oram Ring. Philadelphia; Dr. Charles P. Small, Chicago; Dr. G. McD. VanPoole, Honolulu.

DEATHS.

Dr. Timothy J. Shanahan, Boston, aged forty-eight, died suddenly, May tenth, of heart disease.

Dr. Ned D. Bailey, Brooklyn, aged sixty-six, died May twenty-seventh of heart disease.

Dr. Joseph Schneider, Milwaukee, died June fourth of carcinoma of prostate.

Dr. William Sweeney Stucky, aged forty-three, Lexington, Ky., died June 11, 1927, from apoplexy. He was the son of Dr. Joseph A. Stucky.

Dr. d'A. Giuseppe, Professor of Neuropsychiatry in Naples, died December 29, 1926, aged 66 years. He was the founder of the Italian Oto-Neuro-Oftalmological Society.

PERSONALS.

At the coming International Ophthalmological Conference, this country will be represented by Dr. George E. deSchweinitz and Dr. Walter R. Parker.

Dr. Ernst Fuchs of Vienna is now in South America giving a course of lectures on the eye.

Dr. A. E. Eubank of Kansas City is taking a course of lectures in Vienna, and Dr. Lemoine sails September 17th for special work in Vienna and London.

Dr. Fred C. Stahlman, formerly of Charleroi, Pennsylvania, who spent the winter in Asheville, North Carolina, has opened an office for the practice of ophthalmology and otolaryngology in Waynesburg, Pennsylvania.

Dr. and Mrs. James Moores Ball of St. Louis, accompanied by their daughter, Mrs. Robert Howell Lafean of York, Pa., and Miss Betty Ball Lafean, sailed from Boston, July 9th, to spend two months in England and Scotland.

Dr. George E. deSchweinitz of Philadelphia has recently been honored by the Harvard University in having had conferred upon him the Honorary degree of Doctor of Science, as an expression of his distinction in the world of ophthalmology.

Dr. Frederick O. Schwartz, of St. Louis, recently demonstrated the use of his lens hook in Washington and in Baltimore. Three cataracts were delivered at the Episcopal Eye and Ear Hospital, in Washington; one at the Gallinger Hospital; and three at the Wilmer Institute, Johns Hopkins University. An account of these and of other cases operated by Dr. Schwartz will soon be published. Dr. Schwartz is now Assistant Professor of Clinical Ophthalmology in the Washington University Medical School.

Dr. Luther C. Peter of Philadelphia became President-Elect at the last meeting of the American Academy of Ophthalmology and Oto-Laryngology to serve in 1928.

Dr. Peter's book on the Extra-Ocular Muscles has gone to press (Lea & Febiger, Publishers), and should appear early in September.

Dr. Peter was a guest of the West Virginia State Medical Association (Eye, Ear, Nose and Throat Section), at White Sulphur Springs, from June 21 to June 23 where he presented a paper on "Observations on the early recognition and general management of glaucoma."

SOCIETIES.

Dr. Harold Gifford of Omaha, Nebraska, delivered an address to the Wyoming State Medical Society, at its June meeting, on the Mongolian eye. He takes the position that the slant when present was induced because it is thought to be the ideal.

At the meeting of the Eastern New York Eye, Ear, Nose and Throat Association at Riverwood, Schenectady, the following officers were elected: President, J. Ivimey Dowling, M. D., F. A. C. S.; vice-president, M. S. Lord, M. D.; secretary-treasurer, L. Prescott Brown, M. D. Membership includes the specialists from Albany, Schenectady, Troy, Glen Falls, Amsterdam, Gloversville, and Rutland, Vermont.

At the February meeting of the Ophthalmological Section of the Baltimore Medical Society, Dr. George deSchweinitz of Philadelphia presented a paper on "Changes in the Visual Fields Due to Pressure of Tense Vessels at the Base of the Brain." The paper was copiously illustrated with lantern slides giving the history of the present state of our knowledge of this subject.

The Pittsburgh Ophthalmological Society, at its May meeting, elected the following officers for the ensuing year: President, Dr. E. B. Heckel; Vice-president and Treasurer, Dr. G. E. Curry; Secretary, Dr. G. H. Shuman; Assistant to the Secretary, Dr. J. G. Linn; Reporter, Dr. T. H. Manley, Jr. The annual outing of the Society was held at the Chartiers Heights Country Club on June thirteenth.

The Pittsburgh Slit-Lamp Society has elected the following officers for the ensuing year: President, Dr. W. W. Blair; Vice-president and Treasurer, Dr. Adolph Krebs; Secretary, Dr. G. H. Shuman. Under the auspices of this Society, Dr. John H. Dunnington, of New York City, gave a course of lectures in Pittsburgh, during the month of April, on "Motor Anomalies of the Ocular Muscles."

At the Fifteenth Annual meeting of the Pacific Coast Oto-Ophthalmological Society, held in Spokane from June fourth to seventh, the following officers were elected for the ensuing year: President, Dr. Wm. J. Mellinger of Santa Barbara, California; 1st Vice President, Dr. Robert R. Hampton of Salt Lake City, Utah; 2nd Vice President, Dr. Allison T. Wanamaker of Seattle, Washington; Secretary-Treasurer, Dr. Walter F. Hoffman, also of Seattle. Drs. Walter B. Lancaster and Allen Greenwood of Boston and Dr. John E. Weeks of New York were guests of the Society. The next meeting is to be held in Santa Barbara, California, 1928.

On June 17th and 18th the second annual convention of the Guild of Prescription Opticians of America was held in Buffalo. New York. Among the different speakers was Dr. S. L. Olsho, Philadelphia, who gave an illustrated talk on "A New Phase in the Prescribing and Fitting of Spectacles and Eyeglasses" laying particular stress on correct fitting and showing the trial frame which he uses. Dr. Edward Jackson, Denver, read a paper on "Designation of Lenses", which will probably be published. In the evening Dr. Jackson was the guest of honor of the Buffalo Ophthalmologic Club, of which the Doctor is an honorary member. The dinner was also attended by most of the Guild members. The Ophthalmological Club presented Dr. Jackson with a souvenir as a token of the esteen of its members.

The Colorado Congress of Ophthalmology and Oto-Laryngology was held in Denver, July 22 and 23, and the two weeks' Course given in connection with it extended from July 18 to July 30, inclusive. The number registered for the Congress was 128, the number who took the course was 67. The ophthalmic papers read before the Congress were upon "Hyperesthesia of the Ciliary Muscle," Jerome B. Thomas, Palo Alto, California; "Advantages of the Tucking Operation," Allen Greenwood of Boston; "Hemorrhagic Glaucoma," Everett L. Goar, Houston, Texas; "Surgical Treatment of Ptosis," John M. Wheeler, New York City; "The Mongolian Eye," Harold Gifford, Omaha, Nebraska; "Ocular Syndrome of Pituitary Tumor, Complicated by Extraneous Factors," Walter I. Lillie, Rochester, Minn. A paper written for this Journal and published elswehere in this number upon "The Historical Evolution and Use of Spectacles" was read by Edward Jackson. The instructors for the Course included Allen Greenwood, John M. Wheeler, and Walter I. Lillie in addition to the lecturers and demonstrators from Colorado.

Washington, D. C., proved to be a popular place for the meeting of the American Medical Association. The registration in the Section on Ophthalmology alone was five hundred thirteen. The meeting of the Section was held in the Hall of Nations at the Washington Hotel, which was equipped with loud speakers and was well adapted for such a meeting.

The program of the Section was one that appealed to all classes of men who attended the meeting. The discussions were numerous and of good quality. Under the guidance of Dr. John A. Donovan, of Butte, Montana, the Chairman of the Section, the session operated smoothly.

Following the Chairman's address Dr. Hideyo Noguchi, of the Rockefeller Institute, was given the floor. He discussed the discovery of a microorganism which he has isolated from cases of trachoma, and with which he has produced changes in the conjunctiva of monkeys that closely simulated trachoma in the human being. Dr. Hubert Work, Secretary of the Interior, congratulated Dr. Noguchi on his discovery and briefly discussed the importance of the trachoma problem of the American Indian.

Dr. Henning Ronne, of Copenhagen, Denmark, was the foreign guest of the Section. On the second day he read a very comprehensive paper on his work in the visual fields. Dr. Daniel M. Velez, of Mexico City, was introduced to the Section and given the privilege of the floor.

The Howe Medal for meritorious work in ophthalmology was awarded to Dr. George E. deSchweinitz, of Philadelphia, Pa.

The following officers were elected for the ensuing year: Dr. Walter B. Lancaster, Boston, Mass., chairman; Dr. Edmond E. Blaauw, Buffalo, N. Y., vice-chairman; Dr. William C. Finnoff, Denver, Colorado, secretary; Dr. W. H. Wilder, Chicago, Ill., delegate to the A. M. A.; Dr. Harry S. Gradle, Chicago, Ill., alternate; Dr. William H. Crisp, Denver, Colorado, for one of the Section representatives on the American Board of Ophthalmic Examinations.

The 1928 meeting will be held at Minneapolis, Minn.

An extraordinary collection of fundus photographs and photographs of the living eye was demonstrated by Dr. Arthur Bedell, of Albany, N. Y., at the Washington Auditorium, among the scientific exhibits of the American Medical Association.

MISCELLANEOUS.

Substitutes for the highly inflammable celluloid used in spectacle frames are now made, which are equally cheap and not explosive.

William Mackenzie Memorial: To encourage original work in ophthalmology a William Mackenzie Memorial Fund has been established in Glasgow. More than a century has passed since Mackenzie entered upon the practice of ophthalmology and founded the Glasgow Eye Infirmary and in 1830 published his "Treatise on the Diseases of the Eye." A small committee will be elected annually consisting of ophthalmic surgeons in Glasgow, and this committee will have a wide discretion as to the way in which the income of the fund is to be expended. A medal will be awarded from time to time to the author of original work of outstanding merit in ophthalmology, and grants may be given in aid of research or for other kindred purposes. Contributions are being received by Dr. A. J. Ballantyne, 11 Sandyford Place, Glasgow, C 3.—*Lancet, June 25, 1927, p. 1371.*

GRADUATE WORK IN OPHTHALMOLOGY.

The Fourth Special Graduate Course in Ophthalmology at Vienna, October 1st to December 6th of this year, has proved so attractive that we are informed by cable that the class has now been entirely filled.

The American Board for Ophthalmic Examinations will conduct an examination on September 12th at Detroit at the time of the meeting of the Academy. It will also conduct an examination at Memphis on November 14th at the time of the meeting of the Southern Medical Society.

Information concerning the applications can be obtained from the secretary, Dr. W. H. Wilder, 122 S. Michigan Ave., Chicago.

A course on the Surgery of the Eye will be given in English by Drs. Morax, Magitot, Bollack and E. Hartmann in the Amphitheatre d'Anatomie des Hôpitaux de Paris, 17 Rue du Fer-á-Moulin. This course will include ten lectures starting October 3, 1927, on the dead body and pigs' eyes. Each attendant will perform operations and be given a synopsis of the lectures, printed in English, and containing a description of each operation. Only a limited number of registrants can be accepted.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in *heavy-faced type*. The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is an abstract of the original article. (Bibl.) means bibliography and (Dis.) discussion published with a paper.

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FIG. 1. ESSENTIAL ATROPHY OF IRIS (GRISCOMS CASE)

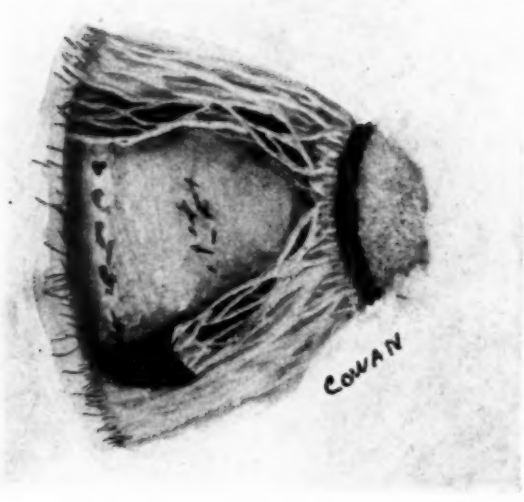

FIG. 2. ATROPHY OF IRIS, DETAILS SHOWN BY SLIT LAMP